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THE MEDICAL JOURNAL OF AUSTRALIA.

VOL. I.—6TH YEAR. SYDNEY: SATURDAY, MARCH 15, 1919. No. 11.

THE PRESENT EPIDEMIC OF INFLUENZA.[1]

BACTERIOLOGY.

By **R. P. McMeekin, M.B., Ch.B. (Melb.),**
Medical Superintendent, Melbourne Hospital.

Our conclusions are based on the bacteriological examinations of thirteen smears and cultures of sputa, seven cultures taken from lungs post-mortem and twenty blood cultures. Unfortunately, many cases have not been investigated, on account of our Resident Bacteriologist having been ill.

The predominating organisms found in sputa have been influenza bacilli, Gram-positive diplococci resembling pneumococci and indistinguishable from them, and *Micrococci catarrhalis,* all in large numbers. Coccal forms have also been present.

Cultures taken from the lungs direct post-mortem have shown influenza bacilli, pneumococci, *Micrococcus catarrhalis,* streptococci and staphylococci in a majority of cases.

The three first-mentioned organisms were usually present in large numbers.

Of the twenty blood cultures examined, three showed *Staphylococcus albus,* probably a contamination, four showed tiny Gram-negative bacilli morphologically indistinguishable from influenza bacilli, but showing cultural differences, whilst one showed Friedländer's bacillus.

The findings of our January cases differ from those of our November cases in the entire absence of influenza bacilli from the latter.

It will be seen that these results correspond closely to those of New Zealand investigators.

Post-Mortem Pathology.

In describing the post-mortem findings, I have made use of facts gained from a series of 30 examinations, made chiefly from our earlier cases. At the outset it is interesting to note, firstly, that in all but two cases there was intense engorgement of tracheal and bronchial mucous membrane with submucous hæmorrhages; secondly, that in the large majority of the cases every lobe of both lungs was involved to a greater or lesser extent; thirdly, that the lung conditions found were identical in practically every case; and, fourthly, that, except in four cases, all the autopsies performed were on patients under forty years of age.

The most striking fact about this series of autopsies is the exact manner in which our findings correspond to those in the New Zealand cases.

For descriptive purposes the cases may be divided into four classes:—

(1) Tracheo-bronchitis, with scattered broncho-pneumonic patches.
(2) Sanguineo-purulent tracheo-bronchitis, with widespread hæmorrhagic and œdematous broncho-pneumonia.
(3) Tracheo-bronchitis, with intense engorgement, with widespread hæmorrhagic broncho-pneumonia, but without purulent exudate.
(4) Septicæmia, with secondary broncho-pneumonia.

In the first class are two cases, both in girls between the ages of sixteen and seventeen, one of whom died 18 hours, the other 48 hours after the onset of influenzal symptoms. In both, the outstanding feature was an intense tracheo-bronchitis, with uniform engorgement of the mucous membrane and scattered pin-point submucous hæmorrhages. The larger bronchi contained blood-stained pus, similar to that expectorated during life. From the finer bronchi, where the engorgement was very much less intense, pure pus could be squeezed in quantity. In one case scattered through both lower lobes were small patches of hæmorrhagic consolidation, surrounded by somewhat œdematous lung tissue. In the other, two areas of dark red consolidation, resembling, on superficial inspection, hæmorrhagic infarcts, were present in the posterior and lower portions of the right upper and lower lobes. Over these areas subpleural hæmorrhages were present, but no pleurisy. On section, the tissue appeared dark red in colour, partly air-containing, partly consolidated, with hæmorrhages, increased friability and engorgement.

These two cases were examples of the earliest stage before widespread pneumonia had had time to develope.

The second and third groups may be considered together, the only difference between them being the absence of purulent exudate in the third group. This class furnishes the picture usually seen (in the stage of engorgement with hæmorrhages and hæmorrhagic œdema), namely, that of intense broncho-pneumonia. In practically every case all lobes of both lungs were involved, the more intense and advanced inflammatory change being seen in the lower lobes, the upper and middle lobes being attacked later and usually showing slightly less marked changes.

The posterior portions of the lobes were almost always attacked first, but in cases of some days' duration the pneumonia had usually spread forward and involved the anterior portions, although, most frequently, the anterior halves to two-thirds of the upper and middle lobes escaped. In several cases both lower lobes were completely involved.

In every case subpleural hæmorrhages about the size of a pin's head were scattered over the involved areas. Pleurisy was an inconstant and never a marked feature. In half the cases no pleurisy existed, except dulling of the pleura overlying the involved portion of the lung.

The lungs were increased in weight, but not to the same extent as in lobar pneumonia. The pneumonic areas showed up as red, bluish-red or slate-blue areas clearly differentiated on the surface from the uninvolved portions. In all cases subpleural hæmorrhages, and in a few localized areas of early pleurisy were seen. In two cases pleuritic effusion of moderate amount was present. On section, these areas appeared

[1] Read at a Meeting of the Victorian Branch of the British Medical Association on February 19, 1919.

red in colour, the shade varying from bright red to a deep claret in different cases and in different parts of the same lung.

In three specimens in the lower lobe, greyish consolidation was scattered amongst the red areas, but the other lobes showed the ordinary red appearance. The cut surface dripped blood in large quantity and the involved tissues were very œdematous. The pneumonia was lobular, not lobar, in type and, even in cases where in the lower lobes the lobar type was closely simulated, the other lobes showed the typical broncho-pneumonic distribution. In the affected areas hæmorrhages had occurred. The friability was greatly increased and in intense cases the lungs were almost diffluent. The areas most markedly involved sank in water, but many apparently consolidated portions floated. In most cases the presence of air-containing tissue was easily demonstrable in the parts apparently most affected. In practically every case the mucous membrane of the trachea and bronchi was intensely engorged and in many there were tiny submucous hæmorrhages. In six of the cases comprising the second group the contents were purulent or sanguineo-purulent; in the third group the contents were frothy, both white and blood-stained froth being seen. The contents corresponded in many cases to the sputum seen before death. In two cases where pure blood had been expectorated in quantity, the engorgement of trachea and bronchi was most intense.

The bronchial glands were much enlarged and softened and in several cases hæmorrhage had occurred into them. In no case was suppuration present.

In the last group are included two cases in which there was an absence of tracheitis and bronchitis, but in which, associated with the usual post-mortem findings in septicæmia, there was hæmorrhagic inflammation of the lower lobes of both lungs, apparently due to blood infection. In both these cases the onset of illness was abrupt and influenzal in character.

Other Organs.

Heart.—Dilatation was not a marked feature. In one case the tricuspid orifice admitted five fingers and in two cases four fingers. In these the mitral orifice admitted three fingers. The right auricle and ventricle were full of dark red clot and in several cases ante-mortem thrombi were found in the right auricle. The heart muscle was not markedly spoiled as a rule, but in about one-quarter of the cases moderately advanced spoiling was present, the muscle being pale, flabby and friable. In one case there was early vegetative endocarditis of the mitral valves; otherwise the valves were clear. In three cases there was marked bluish-red staining of endocardium and heart valves, more noticeable in the right cavities. In two of these sub-endothelial hæmorrhage had occurred just below the tricuspid valves. In these cases the intima of the aorta and pulmonary artery was stained a diffuse red.

Liver.—A feature of several cases, especially in six cases of women dead during pregnancy, was the liver spoiling. The organ in about one-third of the cases was enlarged, pale yellowish-brown in colour, distinctly friable, with definite fatty changes. In the rest cloudy swelling was the only change noted.

The Spleen.—In most cases the spleen was not markedly enlarged and there was only a moderate increase in friability. In a few cases there was definite enlargement, with marked friability, amounting in two cases to diffluence.

Kidneys.—As a rule, the kidneys showed engorgement and cloudy swelling. No example of acute nephritis was seen. In one case engorgement was extreme. In some cases loss of demarcation between cortex and medulla was very obvious.

Adrenals.—In about half the cases the adrenals appeared normal. In several, however, the line of demarcation between cortex and medulla was largely lost, the substance was extremely mushy and in two cases hæmorrhage into the glands had occurred.

Pancreas.—The pancreas showed cloudy swelling.

Brain.—In one case early meningitis was present over the cerebral hemispheres. In two cases small, pin-point hæmorrhages were scattered throughout the hemispheres and thalamic regions.

Muscles.—In one case there was hæmorrhage into both *rectus abdominis* muscles below the umbilicus, with localized destruction of the muscle fibres.

Microscopical.

The report on sections examined by Dr. F. G. Morgan are as follow:—

"The lungs show acute broncho-pneumonia, with great engorgement of vessels, with hæmorrhages into the alveoli, under the pleura, and into the walls of the bronchi. There is desquamation of bronchial and alveolar epithelium, with no marked leucocytic response.

"Other organs show cloudy swelling. Those examined include the adrenals, liver, kidneys, pancreas and heart."

THE PRESENT EPIDEMIC OF INFLUENZA.[1]

COMPLICATIONS.

By **V. M. O'Grady, M.B., Ch.B. (Melb.),**
St. Vincent's Hospital, Melbourne.

In reviewing the cases that have come under our notice during this influenza epidemic, especially in the earlier stages of the disease, one feels justified in including under the name of complications those affections of (*a*) the respiratory passages, (*b*) the lung tissue and (*c*) the serous membrane lining the cavity of the thorax.

A.—Respiratory Complications.

Amongst the most frequent of the respiratory complications met with are:—

(*i.*) *Tracheitis.*—In our series of cases this has been a very common complication. It is met with early, following the sore throat and coryza present in the initial stages. Accompanying the tracheitis, which is evidenced by a dry, irritable cough and retro-sternal discomfort, there has commonly been a laryngitis, the patient speaking with a husky voice, and in a few cases speech coming only in whispers.

(*ii.*) *Bronchitis and Bronchiolitis.*—From the trachea the inflammation probably travels downwards, involving the bronchi and bronchioles, giving rise to a bronchitis and bronchiolitis, and evidenced by irregular temperature, some dyspnœa and a feeling of constriction in the chest, with tenacious, greenish

[1] Read at a Meeting of the Victorian Branch of the British Medical Association on February 19, 1919.

sputum. Rhonchi and moist râles are found on auscultation.

(*iii.*) From the bronchioles the alveolar spaces become involved and lobules of lung tissue later become consolidated, the temperature rises, the pulse-rate becomes more rapid, and there is in the severer cases cyanosis of the face and neck. Dyspnœa is constant. In one case recently in hospital there were scattered patches of broncho-pneumonia separated by areas of resonant lung tissue, the condition approaching closely to lobar pneumonia.

About four cases of our series presented the physical signs of a frank lobar pneumonia, and in these it was noted that the temperature appeared more regular than in cases of broncho-pneumonia. The termination of the pneumonic cases was variable, some by crisis, but the majority by lysis.

(*iv.*) Pleurisy, with effusion, appeared in two cases of the series. One of the patients was obviously *in extremis* and died half an hour after admission. Post-mortem examination verified the diagnosis. In the second case the chest was aspirated and a litre of fluid withdrawn. The patient made an uninterrupted recovery.

(*v.*) In one case with an influenzal onset lobar pneumonia developed, which was further complicated by empyema. The patient was sent to operation, and is now making satisfactory progress. The causative organism, as proved by cultural and microscopical examination of smears, was the pneumococcus.

B.—Gastro-Intestinal Complications.

(*a*) Gastric.—Constant vomiting occurred in three cases which subsequently proved fatal. In one, in a male giving an alcoholic history, hæmatemesis was most severe, the patient vomiting a frothy mucus mixed with bright fluid blood and some clots. He had no pain nor tenderness and gave no history of a previous gastric discomfort. These cases did not answer to the usual treatment, and all were fatal. Milder cases of vomiting were met with, the patient vomiting for twenty-four hours.

(*b*) *Intestinal.*—Meteorism, accompanied by constipation, was met with, the abdomen being swollen and tympanitic.

In no case did we notice any hæmorrhage from the bowel.

C.—Renal Complications.

In about 30% of cases there was definite albuminuria, but full clinical investigation, including pathological examination of urine, failed to confirm the existence of a nephritis.

D.—Nervous Complications.

Many of the patients complained of "backache," which in five cases was most persistent and severe.

One case in particular calls for mention, that of a young woman with persistent backache, commencing two days after the onset of illness, which, on the fourth day, was accompanied by slight retraction of the head and severe pain in the back of the neck. A modified type of Kernig's sign was present. Lumbar puncture was done, the cerebro-spinal fluid flowing under pressure, and 18 c.cm. were withdrawn. When seen an hour later the patient was much easier and pain was less. Four hours later she was free from pain and there was no retraction of the head.

Cultural and microscopical examination of the fluid yielded negative results.

E.—Otitis Media and Empyema of Maxillary Sinus.

In one case both the above conditions were present. The patient complained of pain behind the right ear, over the mastoid region, and also of tenderness over the right maxillary antrum. There was a purulent discharge from the right ear and right nostril, which culture showed to be pure *Staphylococcus aureus*. Microscopical examination showed staphylococci. Local measures were employed, and the patient's condition is improving.

In about 30% of cases the patients have complained of partial deafness, but only in the case cited has a discharge been observed.

F.—Cardiac Complications.

The question of cyanosis seen in severe cases remains open as to origin. In our series no gross enlargement of the right heart has been detected clinically.

Slowing of the heart's action is fairly constant, with fall of temperature and in some cases definite bradycardia has been noted, the pulse-rate in two cases falling to 44 and 46 beats per minute.

Another point worthy of notice is the number of patients who have apparently made uninterrupted recoveries, yet the pulse remained soft and made one view the case with some misgiving. In this class of case the convalescent patient is easily knocked out, and fainting is common. One case would serve to illustrate this point, that of a young woman of 25, who had an attack of influenza, followed by a small patch of broncho-pneumonia at the right base. Her symptoms had disappeared for eight days; she was walking about the hospital for three days, and was considered fit to go to a convalescent home. After walking 20 metres towards a conveyance with two nurses she suddenly collapsed and died within five minutes. The appearance of the body was similar to that seen in other cases of pneumonic influenza. No autopsy was done. In five other cases which had apparently ended by crisis, the pulse has become softer and softer and the case has terminated fatally.

In conclusion, I would like to mention six cases of obstinate retention of urine where there had previously been no trouble. Constant catheterization was necessary until convalescence was begun, when the retention disappeared.

THE PRESENT EPIDEMIC OF INFLUENZA.[1]

SYMPTOMATOLOGY.

By **W. S. Newton, M.B., B.S. (Melb.),**
Medical Superintendent, Alfred Hospital, Melbourne.

I have been asked to speak to-night on the subject of symptomatology of the present influenza epidemic. Owing to the pressure of work during the last few weeks it is only possible to give you what might be termed first impressions. I have divided my series of cases into the following types, but the division is not arbitrary, as one type insensibly merges into another.

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This classification has been made not so much on the physical signs as on the predominant symptoms.

(i.) Ordinary or Abortive Type.

The onset is usually with headache, pain in the back and limbs, fever, malaise, perhaps some cough, but no pulmonary or other complications. The temperature usually falls to normal within three to seven days.

(ii.) Gastro-Intestinal Type.

The predominant symptoms are vomiting, diarrhœa and abdominal tenderness; occasionally there is rigidity of the abdominal wall, but this rigidity is, as a rule, intermittent. One patient was admitted with a history of two days' illness, sudden onset with slight headache, vomiting and lower abdominal pains, especially on the right side. One examination definite tenderness over the appendical region was found. Abdominal section was performed for appendicitis, but the appendix was found to be normal, and a few hours later typical pneumonic signs developed.

(iii.) Nervous Type.

Usually there is a sudden onset with severe headache, delirium and perhaps coma. In one case marked head retraction was found, and this case was suspected for some hours of being one of meningitis. Two cases of the series gave typical signs and onset of a cerebral hæmorrhage, but in both there were occasional crepitations at the bases. At the autopsy nothing was found in the brain in either case, but both showed a typical hæmorrhagic broncho-pneumonia.

(iv.) Pneumonic and Predominant Type.

This type is again subdivided according to the physical signs into the following:—

(*a*) An alveolitis, in which there are no signs of consolidation, crepitations only being found.

(*b*) Bronchitis and alveolitis; again there are no signs of consolidation, the only physical signs being rhonchi and crepitations.

(*c*) The broncho-pneumonic, at first with simple prolongation of expiration and crepitations and later with dulness, tubular breathing, increased vocal resonance and showers of crepitations simulating a lobar pneumonia

(*d*) Massive pneumonia. In all probability this is a later stage of sub-type (*c*). The physical signs are dulness, diminished vesicular murmur and decreased vocal resonance, with some crepitations near the stethescope on deep inspiration.

I propose next to discuss the physical signs and symptoms separately.

Onset.—This is usually sudden, with headache, pain in the back and limbs and some cough. Rigors are uncommon, but frequently the patient complains of feelings of "hot and cold all over."

Fever.—The temperature usually rises rapidly and the fastigium is reached in a day or two. It may be as high as 40.5° or 41° C.. In moderately severe cases the most common temperature is between 38.3° and 40° C.. A daily oscillation of ½° to 1½° per diem is the rule. The termination is most frequently by lysis, but occasionally it is by crisis. After the temperature has fallen and remained at the normal level for some hours, a slight recrudesence of fever for a few days is not uncommon.

Circulatory System.—Pulse.—In the early stages and frequently throughout the whole course of the disease, the pulse is slow in relation to the temperature. A pulse of 90 to 100 beats per minute is frequently found with a temperature of 39.4° or 40° C.. The volume is usually fair until toxæmia becomes severe and then the volume rapidly becomes poor and the rate rises to 150 or 160 beats per minute. In convalescence the pulse frequently becomes extremely slow, a pulse-rate of from 44 to 50 being not uncommonly recorded.

Blood Pressure.—In this series of cases the blood pressure was comparatively low, pressures above 120 mm. of mercury being rare. More frequently the pressure varied between 90 and 110 mm.. The pulse pressure was normal, except in the advent of severe toxæmia when it fell rapidly.

Heart.—Even in the most pronounced cyanotic cases no right cardiac dulness was found. The first sound at the apex was frequently poor, whilst a basal systolic murmur was detected in a number of cases. The murmur frequently disappeared a few days after admission.

Blood.—The leucocyte count showed a leucopenia, 4,000 to 6,000 being the rule. It was observed that in cyanotic cases the coagulation time of the blood removed by venesection seemed to be decreased as the blood was thick, tarry and clotted rapidly.

Hæmorrhage.—Hæmorrhage from mucous surfaces was a common symptom. Epistaxis, hæmatemesis, metrorrhagia and hæmorrhage from the bowel occured with varying frequency. In two cases only were the patients much exsanguinated and in several cases the loss of blood seemed to be beneficial.

Patient's Colour.—In the early stages and mild cases the face was flushed, occasionally a duskiness, not a definite cyanosis, was noted. Cyanosis was common in severe cases, the face being blue-black. This cyanosis was apparently not due to right heart failure, as there was no right cardiac dulness, nor was it affected to any extent by the administration of oxygen. Out of twenty-five cyanotic patients only five recovered. In a few cases the patient's colour was that of white marble. These patients were extremely ill and passed rapidly into a typhoid state, death occurring as a rule within 24 to 48 hours.

Alimentary System.—Anorexia was common in the early stages, but in the mild cases was rapidly replaced by hunger, even when the temperature was still high.

Tongue.—Most commonly the tongue was moist and coated with a white fur at the centre, but red at the tip and edges. In cases with marked toxæmia the tongue was usually dry and brown.

Pharynx and Fauces.—The pharynx and fauces were the seat of catarrhal inflammation and showed marked injection.

Vomiting was a common symptom, especially in the initial stages, but in cases other than the acute gastro-intestinal type, it usually cleared up within a few days.

Diarrhœa was met with in several cases.

Abdominal pain and tenderness was frequent, the pain usually being epigastric.

Tympanites was observed in a few cases.

Spleen.—In two cases the spleen was found to be palpable.

Respiratory Symptoms.—Catarrh of the upper respiratory passages and laryngitis were usually present. The majority of the patients had an irritable, distressing cough, often paroxysmal in character, which frequently persisted during convalescence. The sputum was usually viscid and tenacious in the early stages, later becoming purulent and frequently blood-stained.

The respirations were generally not laboured and an expiratory grunt infrequent. The average respiration rate in pneumonic cases was between 28 and 32 per minute, but in severe cases rose as high as 80 per minute.

Nervous System.—Headache was an almost constant symptom. It was generally throbbing in character and the patients frequently complained that it felt as if the top of their head was being lifted. A few cases showed persistent occipital headache.

Head retraction was observed in one case. In the severe toxic cases the knee jerks disappeared comparatively early. There was at times generalized muscular twitchings, while muttering delirium or coma was common in the severe toxic cases.

Urinary Symptoms.—The urine was scanty, high coloured and of a high specific gravity. A trace of albumin was common, whilst acetone was found in a few of the cyanotic cases. Three patients suffered from suppression and two from retention of urine.

Generative System.—Miscarriage and premature labour were frequent.

Skin Rashes.—Various skin rashes were observed, the following being the main types: sudiminal, erythematous, papular, vesicular, petechial and purpuric. The majority of the cases with purpuric rashes terminated fatally.

Special Senses.—Deafness occurred in several cases but disappeared early in convalescence.

ADMONITIONS CONCERNING THE PRESENT PANDEMIC OF VIRULENT PNEUMONIA.

By **Samuel T. Knaggs, M.D., F.R.C.S., I.,**
Bondi, Sydney.

It may be interesting to review some errors or oversights which possibly may have occurred with reference to the supervision and management of the virulent pandemic now invading the Australian States.

(1) *The Name.*—This is misleading. It should not have been called Spanish influenza. It is more correctly a virulent pneumonia. It is quite possible that, during the first forty-eight hours of the invasion symptoms simulating influenza appeared, attributable to the Pfeiffer's influenza bacillus, but the principal factors contributing to the fatal termination are Fränkel's pneumococcus and the streptococci. The gravity of the disease strictly warrants the use of the latter designation.

By calling and misnaming the present pandemic pneumonic influenza it confuses the public mind with the influenza which has invaded this State for the last few years and now gives the Victorian medical authorities an excuse to insinuate that New South Wales is now only suffering from a long-standing epidemic which had existed for years. This is totally erroneous. This virulent pneumonia is quite a new importation and its origin is from abroad.

(2) *Misnaming the Material Employed: Vaccine and the Operation: Vaccination.*—The word "vaccine" was originally introduced to signify the lymph occurring in the eruptive vesicles of a cow-pox. The cow has nothing whatever to do with the suspension of bacteria now used for inoculation. Unpleasant reminiscences of how vaccinations were conducted at the public depôts in Sydney during the small-pox scare of 1913 still haunt the public mind and act as deterrants to inoculation when so named.

(3) *Closing All Schools.*—The worker's wife does not care to have her household duties interrupted by having her children in the house during school hours, and promptly sends them out of her way to play in the streets and by-ways, thus acquiescing in their becoming gutter-snipes, a most insanitary occupation and the best way possible to enable them to contract any contagious disease. It would be better far to keep such children at school under strictly hygienic conditions and the careful personal surveillance of their teachers. Disinfectant plunge and shower baths should be supplied for daily use. Antiseptic sprays applied to the nose and mouth twice daily, school lessons relaxed, but, when possible, to be held in the open air and varied by physical exercises, drill and open-air games. Thus the rising generation would receive a practical exposition of health-retaining procedures.

It is contended that the schools are so overcrowded that such a procedure is impossible. The truant inspectors should be able to indicate easily such children as had homes with wholesome surroundings. Why not send these home where they can be well cared for, to lessen the crowding, that sadly neglected little ones should at least have some protection from the State?

(4) *The Compulsory Wearing of Masks.*—One channel for the elimination of poisons generated by the vital processes within the body is the windpipe. Through it the oxygen-loaded air enters the lungs, to which it yields its oxygen and then absorbs carbonic acid gas and other deleterious waste products, which again pass out through the mouth, to be dissipated into the outside atmosphere.

The Black Hole of Calcutta illustrates the serious consequences which resulted through a number of people being crowded into a small room without ventilation, and in which they were compelled to breathe over and over again the same exhalation from their lungs for several hours. They were poisoned by the emanations from their own lungs.

The wearing of masks only affords a partial protection against infection. The unprotected eyes are fallible; so is the skin; and infection can also be conveyed by flies and other insects. Those ardent advocates for the wearing of the masks now authorized to be used do not appreciate the grave danger to which a subject is committed by wearing them for several hours daily. It condemns them to a miniature Calcutta Hole. The process towards an unfavourable termination certainly is longer, more insidious, less harrowing, yet in the end must seriously endanger the subject's health and lower his power of resisting infection. Already there are complaints of severe head-

aches, debility and other symptoms of poisoning by a vitiated atmosphere.

The fault is with the masks. A contrivance should be perfected by which the exhalations of the lungs should be conveyed from the mouth outside the mask to the surrounding atmosphere. Such an innovation has been contrived and has been used by the writer of this article with great success. Without doubt the wearing of masks has to some extent stopped the progress of this pandemic, but when the Executive Council of New South Wales, without the sanction of Parliament, proclaimed that masks must be worn, or a penalty exacted, it would have been more humane and considerate to have provided a mask that could have been worn without injury to the health of the wearer. Possibly in the near future, this question may engage the attention of the higher courts of the Commonwealth, or even be referred to the Privy Council of Great Britain.

Fortunately these microbes are short-lived and rely upon the propagation of their species by passing through and infecting a series of living organisms. This process of passing through a series of living subjects so attenuates the virulence of the pandemic that it ultimately grows milder and ceases.

It may be more charitable to attribute to this reduction of virulence, the reason why the medical authorities of Victoria viewed complacently recent milder cases of virulent pneumonia and did not promptly define the nature of the disease. Yet it is to be deplored that their action suggested a suspicion that the course they took was prompted by interested motives.

In penning these observations it is not the desire of the writer to reflect upon any action of the authorities; rather, it is his hope that they will reflect and see that the most up-to-date measures will be adopted to combat the great peril that now threatens these States.

THE GAUZE MASK: SOME EXPERIMENTS.

By **Rees F. Llewellyn, M.B. (Syd.),**
Sydney.

The following experiments recently made by the writer may be found of use in assessing the value of the gauze mask in preventing the ingress of droplets of infective mucus to the air passages.

Air laden with vaporized pneumococcus vaccine, standardized by Dr. Finckh at 1,000 millions per c.cm., was pumped with a bellows through an apparatus (of which a diagram is given herewith) under conditions in certain respects approximating to those of natural respiration. In the first experiment, in order to obtain a standard for comparative purposes, gauze was not interposed in the path of the current, while in the remainder the vapour was made to pass through different thicknesses of butter muslin. In all cases the vapour was collected in a tube containing a saline solution. Hæmacytometer counts were then made and noted.

I do not claim strict mathematical accuracy for the results, but I endeavoured to attain it as nearly as could be hoped for outside a well-equipped laboratory. After many preliminary experiments the apparatus finally adopted was that shown in the diagram. The vaccine was vaporized by a P.D. & Co.'s nebulizer, the nozzle projecting in each experiment 0.6 cm. into the centre of the base of the chimney of an incandescent gas lamp, both vaporizer and chimney leaning at an angle of about 45° from the perpendicular. A chimney of this type was chosen because it was perforated near the base by six holes (each 1.09 cm. in diameter). Losses of vapour were thus minimized by diffusing the back currents of air during the closure of the apparatus for "expiratory" purposes, while plus pressures were prevented from arising in the chimney during the same period.

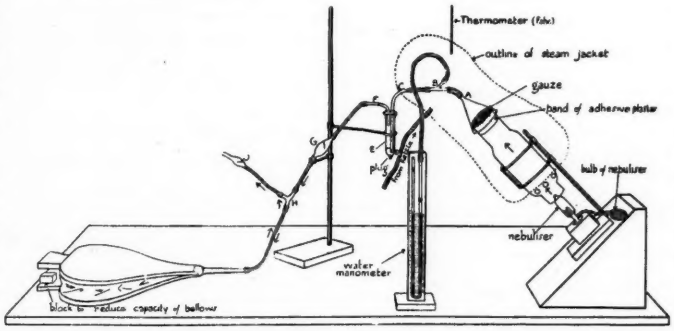
The top of the chimney was fitted into a glass funnel (with a neck of 0.6 cm. inner diameter) in the manner illustrated. A band of adhesive plaster was placed round the chimney top before fitting with a collar projecting slightly beyond the edge of the glass. This collar was then everted, so that on pressing the chimney top into the funnel the collar became adherent to the funnel, sealing the junction. Sealing-wax was then poured into the angle, the chimney and funnel being thus converted into a rigid, air-tight unit. After the first experiment (without gauze) eight, then six and then four layers of butter muslin were stretched, not tightly, across the chimney top before applying the band of adhesive strapping. After passing through the neck of the funnel the "inspired" air was drawn through 0.48 cm. tubing almost horizontally to the angle of the tube at *C*. The distance to *C* from *A*—the angle between the side of the funnel and the neck—was 11.4 cm.. A Y-tube here allowed of connexion with a manometer. From *C* to *D* the current, on the production by the bellows of a minus pressure in the collecting tube *E*, descended through the vertical 0.48 cm. tubing to beneath the surface of exactly 1 c.cm. of filtered, sterile 1% saline solution, the end of this vertical tube reaching to 0.6 cm. from the bottom of the collecting tube. Escaping from the vertical tube, the air in a brisk succession of bubbles rose through the saline, leaving its vaporized vaccine therein. Its further path was through the tube *F* and the air-valve *G* to the bellows, thence back to the *Y* tube *H* and (the valve *G* being now closed) through the now open valve *J* to the outer air.

The collecting tube *E* is important. It was improvized out of the barrel of a patent ear syringe, and was selected because it was torpedo-pointed and only 1.4 cm. in diameter, so that a very small quantity of collecting fluid would reach a suitable height in it. The nozzle was perforated by a small aperture, which, during the experiments, was sealed with a specially cleaned wooden match, reinforced on the outside with shellac. The top of the collecting tube was too small to allow of the use of a cork perforated with two 0.48 cm. holes, so I utilized a diaphragm of rubber and adhesive strapping, sealing the top also with wax. Extreme precautions were taken to prevent contamination of the collecting tube and its rubber cap, and the saline solution was introduced with a clean hypodermic syringe through the long, vertical, inner tube.

The inlet valve in the side of the bellows was closed, so that air could enter only through the nozzle. A block was fastened to one handle of the bellows, in

such a manner as to limit its expansion. Had this not been done the number of inspirations at the manometric pressure which was employed would have been only about ten per minute, whereas I wished to approach more nearly the natural rate of tranquil respiration. As a matter of fact, I eventually slightly exceeded it.

A considerable muscular force was required to work the bellows, even with nothing attached. This was desirable, as a marked increase of force produced only slight variations of the manometer, and I found that an assistant was able with comparative ease to attain a given pull on the water manometer with rarely an error of more than a millimetre. It was found, too, that the care necessary to depress the manometer to a given point (and hold it there for a second), together with the high resistance of the bellows, tended to make one maintain a surprisingly even rate of "respiration" in the apparatus.



As I aimed at imitating comparatively closely natural inspiration, with the aid of the manometer let in near the neck of the funnel, I was, of course, obliged to use a lighter fluid than mercury. I used coloured water, and as the specific gravity of mercury is about 13.5, a range of movement was secured in the manometer about 13½ times as great as that of mercury. The manometer was a U-tube, so that all readings on the millimetre scale had to be doubled.

It was calculated that if a minus pressure of 1 mm. Hg. (the usual minus pressure in the nostrils in tranquil respiration) were maintained in the neck of the funnel, the velocity of the air current here would be about four times as great as through the nostrils, whose total area in an adult man I took to be about 1.29 sq. cm.. This, however, would not matter, as my concern would be with the velocity of the current through the mask. The area of the top of the chimney was about 22.5 sq. cm., and as I estimated that in many individuals wearing closely fitting masks the area of mask actually breathed through is no greater than this, I decided certainly not to reduce the pull on the manometer below 1 mm. Hg., or about 13 mm. H_2O. On the contrary, as there are frequent increases of inspiratory pull, far greater than 1 mm. Hg., even in an individual leading a fairly sedentary life, I decided to work the manometer on a minimum pull of 26 mm. H_2O., or nearly 2 mm. Hg..

Assuming, further, that the man who puts on a mask further decreases his intranasal pressure with each additional two layers of gauze, I decided to increase the pull slightly in my experiments in a corresponding manner. I may have been wrong in this, but, if so, the inference is merely that I subjected the gauze to tests more severe than was necessary.

I may here mention that each experiment was carried out, so far as concerned the apparatus from the lower part of the chimney to the tube angle at *C*, in a temperature of 37.8° C.. This was done partly to equalize conditions in the experiments and partly to reduce condensation and was effected by means of a steam jacket.

Coming now to the nebulizer: it was found that by taking the time from a loudly ticking clock one could ensure the production of exactly 120 compressions of the bulb in one minute. These no doubt varied in force, but I found that in every experiment the note of the nebulizer changed in a particular way (indicating that the charge was nearly exhausted) at just about the one hundred and tenth compression.

Across the top of the nebulizer I adjusted a piece of very fine brass wire gauze, to divide the spray finely (of this later), and it was through this that the vaccine was introduced at the last moment, passing through the gauze the needle of a hypodermic syringe. The nebulizer will not spray unless filled to a certain level, and as I wanted to use as much of the vaccine as possible, I placed eighteen beads in the bottom of the chamber.

Next we have to consider the vaccine. Fifteen or twenty minutes before each experiment I abstracted with a syringe from a stock bottle of 5 c.cm. of vaccine (containing 1,000 millions per c.cm.) exactly 1 c.cm. vaccine. The stock bottle had previously been shaken for a long time, after the addition of several beads. To the 1 c.cm. vaccine I added four small drops of a saturated alcoholic solution of gentian violet—about 0.12 c.cm. altogether—the same pipette being used in each experiment. Later I added three drops of glycerine, using the same rod in each experiment. The mixture was shaken well and then transferred to the nebulizer, which, by the way, was adjusted exactly similarly with respect to the lamp chimney on each occasion. At a word, the bellows and the nebulizer were set in action simultaneously, my assistant taking the former and I the latter. At the end of one minute, during which a third person had counted the respirations, we stopped simultaneously. Just about 0.12 c.cm. of fluid was left in the nebulizer and just about 0.12 c.cm. dribbled from the nozzle on to the table. The quantity of fluid placed in the nebulizer had been 1 c.cm., 0.12 c.cm. and 0.09 c.cm., or about 1.21 c.cm., so that approximately 0.97 c.cm. was sent into the apparatus as a spray in each experiment, containing about 800,000,000 cocci. As will be seen presently, there was a big loss from condensation, but I had expected a greater.

I shall now give briefly the results.

Experiment I.—Without gauze. General conditions as already stated.

Twenty-two inspirations with bellows. Minus pressure attained at each inspiration near neck of funnel of about 26 mm. H_2O (about 2 mm. Hg.); 120 compressions

of bulb of nebulizer. Collecting tube detached and shaken. Fluid abstracted through nozzle. Smear proved cocci to be difficult to see—completely decolourized. (Nevertheless, gentian violet added in later experiments to maintain conditions.) Cocci restained with diluting fluid containing fuchsin. Result of hæmacytometer count = 240 millions.

Experiment II.—With eight layers of gauze.

Twenty-three inspirations. Minus pressure approximately 40 mm. H_2O; this increase in pull for a reason already given. All other conditions as before. Hæmacytometer count = 76,000,000, indicating a stoppage as compared with Experiment I. of 68%.

Experiment III.—With six layers.

Twenty-two inspirations and minus pressure of about 36 mm. H_2O. Count = 96 millions, or a stoppage of 60%.

Experiment IV.—With four layers.

Twenty-two inspirations at minus pressure of 30 mm. H_2O. Count = 128 millions, or a stoppage of about 46%.

Experiment V.—Repetition of Experiment I. (without gauze).

Result = 268,000,000. I have not averaged this with Experiment I., as the 1 c.cm. vaccine used was the last in my stock bottle, and, in spite of precautions, may have contained more cocci than the previous specimens.

(N.B.—After each experiment the parts were thoroughly washed and cleaned with usual bacteriological precautions. Likewise the hæmocytometer plate, pipettes, etc..)

Now let me detail two little experiments which are very interesting, and in the light of which we must judge the foregoing results. I made these experiments first, but I place them last:—

Experiment VI.—

Nebulizer was filled with 1 c.cm. saline solution (in place of vaccine), four drops gentian violet solution and three drops glycerine, and forcibly sprayed through the wire gauze on hæmacytometer plate held about 7.5 cm. above it. An examination was then made under low power agains tthe Türck's rulings. This experiment was repeated at various heights. Result: Fully 90% of total number of spots on plates were of a diameter of one-twentieth millimetre or less.

Experiment VII.—

I and others coughed, sneezed and spluttered in various ways on hæmacytometer plates, and I examined the drops at once under a low power. Result: Fully 90% of total number of spots seen on plates were one-tenth millimetre across or more.

Conclusions.

Although our eight layers of gauze prevented the ingress of but 68% of cocci, as compared with Experiment I., we must, in view of Experiments VI. and VII., concede that the honours lie with the gauze, which, from several points of view, was subjected to a considerably more severe test than we might have chosen. In view of the tiny size of most of the drops ejected from the nebulizer, indeed, it would not be surprising to find that, had we used an average drop of twice the size, the results would have looked very considerably better on paper.

We must not forget, too, that when everyone in a crowd is wearing a mask the dangerous droplets have to pass through not four but eight layers of gauze and a wide air space in order to reach a recipient from a transmitter.

As to the reason for the comparatively slight increase in the stoppage effected by eight as compared with six layers of gauze, I assume it to be due partly to the extremely small size of the droplets which would reach the seventh and eighth layers. The spots made by many on the hæmacytometer plate were one-fiftieth millimetre and even one-sixtieth millimetre in diameter. It is quite possible, especially if the pull on the manometer be raised somewhat, that a rather low percentage of them might be stopped.

With other aspects of the mask question I am not concerned in this paper, but may be permitted to make one suggestion. It has been suggested to me that the saturation of the inner layers of the mask for some hours by the moisture of the breath may tend to determine the majority of the bacilli caught in the mask to the inner layers thereof, and that if the mask be then allowed to become dry and be re-applied before death of the bacilli, the wearer may get a sudden and large dose of them. I suspect this is a very real danger, and would therefore suggest that, after the mask has been washed, sterilized and dried it be dipped in a weak solution of glycerine, say 5%, in water and again hung up for some hours. All the water which the hygroscopic glycerine could not hold, would by then have evaporated, leaving the mask very slightly moist, while the antiseptic qualities of the glycerine would be unfavourable to the multiplication of bacilli in the mask. To increase this advantage a trace of thymol might be added to the glycerine solution.

Reports of Cases.

CONGENITAL DEFECTS IN THE LOWER BOWEL RECURRING IN THREE SUCCESSIVE CHILDREN OF ONE FAMILY.

By **Allan S. Walker, M.B., Ch.M. (Syd.),**
Parkes, New South Wales.

A healthy women, aged 30 years, gave birth to an apparently normal male child in October, 1915. In 36 hours the child showed great abdominal distension, the bowels had not moved and there seemed to be considerable pain. Examination revealed an imperforate rectum, though the anus and the rectum for 7 cm. to 8 cm. were normal.

Under ether the abdomen was opened and the lower normal part of the rectum was found to end within the peritoneal cavity; the remainder of the rectum, the sigmoid and descending colon were absent. Owing to the great distension further examination was difficult, even after incision of the ileum, which was drained as a means of relief for the pain. The child died in 24 hours.

In May, 1917, a female child was born. The rectum was patent as far as the finger could reach, but a similar condition rapidly developed. On opening the abdomen a firm, cord-like structure, about 0.5 cm. thick, was found running up from the occluded lower gut and attached to the abdominal wall by a small fold like a rudimentary mesentery. No large bowel was found and nothing was done, as the parents would not consent to a palliative operation unless the defect were a minor one and easily corrected. This child died in 18 hours.

On January 17, 1919, the mother, unexpectedly starting labour, was unable to travel to the hospital where she had engaged and was confined in Trundle by Dr. T. D. Bertram who has kindly furnished me with the following details:—

The child seemed normal, but within 24 hours there were abdominal distension, pain and temperature of nearly 40° C.. Examination revealed a blind end in the rectum less than 5 cm. from the anus. Considerable quantities of fluid rapidly collected in the peritoneal cavity and the child soon succumbed. Operative interference was refused by the parents.

In no case could an autopsy be made, so the exact anatomical condition cannot be described. In the first two cases no large intestine was found during the limited exploration which was practicable and even when the ileum was drained as low as possible (judging by the selection of a loop which was anchored in the right iliac fossa) no improvement followed. This result accords with statistics, which point to an extremely high mortality in all forms

of malformation of the lower bowel, except the lesser grades of imperforate anus.

The mother has one living healthy child, born six years before the first of this series and has had no other pregnancies. Both parents have irreproachable family and personal histories and are robust, healthy people.

Surely such a succession of similar abnormalities must be unique.

Reviews.

PSYCHO-ANALYSIS.

After being out of print for a period of about three years, "Papers on Psycho-Analysis," by Ernest Jones, reappears with considerable additions and alterations.[1] Eleven of the chapters are printed in English for the first time, which is a pity, as it would be much better to keep the German language associated with this class of study, as it has been in the past. The author claims to be the first English psychiatrist to have accepted Freud's views concerning the all-pervading sexual influence upon normal and abnormal functioning of the mind. As most people are aware, the psycho-analysts, including the author, scorn chemistry and morbid anatomy as being important factors in the disturbances of the psyche, but glibly state that the mind is "an apparatus which can be stirred into activity by any stimulus, emanating either from without or within the individual, and the resulting activity is always to restore the original condition of rest by bringing about a state of affairs in which the effect of the disturbing stimulus is nullified." How this "apparatus" works they do not state. All through their writings they postulate subdivisions of the mind in a vapory kind of way, and quite ignore the brain as a definite organ, made up of definite cells and fibres liable to be affected by disease like any other organ, and thereby to have its proper functioning upset.

In the preface, the author accuses Jung and some of his Swiss pupils of abandoning the principles of psycho-analysis in favour of mysticism, and then later on he acknowledges that the views of Freud, whom he champions, have undergone a continuous evolution during the last twenty years. This arbitrary alteration and contriving is characteristic of the advocates of psycho-analysis. Dr. Ernest Jones supports Freud's theory, that forgotten infantile sexual impulses are at the bottom of the neuroses. In some of the chapters the undoubted scholastic merit which the author possesses, gives the argument a smooth and interesting touch, which might easily attract those who have not studied the question from both sides. On the other hand, chapters like "the dream manipulation of numbers" make the reader feel a benevolent pity for any branch of educated men who could subscribe to these ideas. In the psycho-analytical treatment of neuroses the claim of the psycho-analysts is that the bringing to light of an aberrant sexual impulse means increased control of it, and is therefore curative. When critics claim that "suggestion" is employed the psycho-analysts are highly indignant in their contradiction; they then proceed to do a psycho-analysis. The patient already knows that this is for curative purposes (it is not necessary for the physician to tell her definitely in so many words, as she knows that is why she is there), and a neurosis is cured. The psycho-analysts who claim that no "suggestion" is employed, might well be referred to the case of the countryman in the casualty room of a hospital, who had a thermometer put into his mouth to have his temperature taken. When the thermometer was withdrawn he expressed himself as feeling much better. He had never seen a thermometer, and thought it was some curative agent. Exactly the same conditions are present in psycho-analysis, and yet the psycho-analysts deny the existence of suggestion. Perhaps the thermometer was a phallic symbol? It is a well-established fact that neuroses can be cured by suggestion, and it is a well-established fact that insanity cannot be cured by suggestion. Neither the author nor any of the psycho-analysts has had any degree of success in the treatment of insanity by psycho-analysis, although they take great pains to unravel the mysterious works of the "conflicts," "resistances" and so forth. The author states that: "up till the present, psycho-neuroses have been treated better than the psychoses, but one is justified in entertaining the hope that further research may be profitable." It is twenty-five years since psycho-analysis was introduced by Freud. If this is all that psycho-analysis has accomplished in that time in the treatment of insanity the outlook is by no means hopeful. And yet the author runs down Lugaro's "Modern Problems in Psychiatry" in the following terms: "The volume is chiefly concerned with problems of chemistry and morbid anatomy, and advocates a tendency in psychiatry, the relative fruitlessness of which I have disparagingly contrasted with that pursued by Freud." Dr. Ernest Jones's best chapters are those dealing with the neuroses and symbolism. The latter is somewhat historical, and is an instance of the author's wide extent of knowledge of mythology, anthropology, folk-lore, philology and many other sciences. The keynote to the psycho-analysts' view of the causation of neurosis is that no neurosis can possible arise with a normal sexual life. Morbid anxiety is also a sexual manifestation. In short, practically everything conected with life, is associated with the sexual impulse. Certain temperaments are claimed to be due to an anal-erotic complex. Although it does not offer much of practical value to the reader, the chapter on war shock (without which no book is nowadays considered complete) is interesting on account of the author's theory concerning the ætiology of war neuroses.

The chapters on the education of children are well worth reading for the sake of the general information about the growing child which they contain, and also because they deal with the much discussed question as to how much, if any, enlightenment on the sexual question should be given to children. A glossary of the terms used in the book completes this extensive work. It is a book that should be read by all interested in psychiatry, provided they have also studied the morbid anatomy of the insane.

[1] Papers on Psycho-Analysis, by Ernest Jones, M.D., M.R.C.P.; Revised and Enlarged Edition; 1918. London; Baillière, Tindall & Cox; Royal 8vo., pp. 715. Price, 21s. net.

PNEUMONIC INFLUENZA.

The Chief Secretary of New South Wales has published in the *Government Gazette*, No. 48, of March 5, 1919, additional regulations under the *Theatres and Public Halls Act, 1908*, as follows:—

> Where theatres and picture show premises are used regularly during the week or on several nights of any week, such premises shall be thoroughly disinfected daily by washing or spraying the floors with a solution of phenol in the proportion of one part of phenol and forty parts of water.

A similar regulation is introduced in the section dealing with public halls.

In the *Victoria Government Gazette*, No. 42, of March 3, 1919, the Minister of Public Health publishes further regulations under the *Health Act, 1915*, entitled Consolidated Influenza Amending Regulations, No. 1. According to these amended regulations, five persons are now permitted to be at one billiard table, instead of two as determined previously. In connexion with the regulations dealing with the serving of intoxicating liquors, etc., at hotel bars, it is now determined that at least 25 square feet floor space shall be available for each person in a bar, club room, etc., where liquor is offered for sale. The licensee or secretary must display a large notice informing those resorting to these bars or rooms of the amount of floor space to be available for each person. If the proper health authority is satisfied that this provision is not being carried out the health authority may order that the provision shall be withdrawn in respect to the particular premises or club and the closure regulations previously introduced shall then apply.

The regulations dealing with the conduct of billiard rooms, licensed premises and clubs issued previously are suspended as from March 4 and those dealing with other preventive precautions (see *The Medical Journal of Australia*, March 8, 1918, p. 197) are suspended as from March 8, 1919.

The last new regulation forbids persons or firms controlling railway trains, boats or vessels from using any vehicle in their possession for the purpose of carrying passengers from an infected area for purposes other than business purposes. Any person making such a pleasure excursion is also deemed to have broken the regulation.

THE PROPHYLAXIS OF INFLUENZA.

At the Annual Meeting of the American Public Health Association, held in Chicago from December 8 to 11, 1918, a full discussion on the several aspects of epidemic influenza took place. After many speakers had expressed divergent views concerning each and every aspect of the prophylaxis, ætiology and treatment of the disease, four committees were appointed to consider and report on administrative measures, on administrative measures for relief during the epidemic, on the use of biological products or vaccines and on the history and statistics of the epidemic. The second committee presented a short report soon after its appointment. The committee dealing with the bacteriology and specific prophylaxis and therapy also issued a preliminary report. This was presented by Dr. William H. Park, of the New York Public Health Service. The report is as follows:—

> Your committee reports that the epidemic disease known as influenza is believed to be due to an undetermined organism which causes an infection that lowers the resistance of the body as a whole and of the respiratory organs in particular. This allows the invasion of other pathogenic organisms. The most important complicating infections are due to influenza bacilli, different strains of pneumococci, different strains of streptococci, etc.. In each case one or several micro-organisms may be present. In different portions of the country a dominating variety of organism has been found to differ.
>
> Assuming that the cause of the epidemic is an unknown virus, it does not seem possible at present to prevent the primary disease by vaccination with known organisms. Against the secondary infections there would seem to be theoretical basis for the use of vaccines prepared from organisms responsible for the complications that may develope in various localities at various times.

A committee of experts was appointed to deal generally with the many issues involved and this committee has issued an important report. The following passages occur dealing with the question of inoculation for the complicating infections:—

> The committee has not sufficient evidence to indicate that they can be used with any confident assurance of success. In the use of these vaccines the patient should realize that the practice is still in a developmental stage.
>
> The committee believes that when vaccines are used experimentally for the purpose of determining their preventive or curative value, the following conditions should be complied with:—
>
> (*i.*) The groups of vaccinated and unvaccinated persons should be the same in number.
>
> (*ii.*) The relative susceptibilities of the two groups should be equal, as measured by age and sex distribution, previous exposures to infection without development of influenza and a previous history as to recent attacks of the disease.
>
> (*iii.*) The degree of exposure in each group should be practically the same in duration and intensity.
>
> (*iv.*) The groups should be exposed concurrently during the same stage of the epidemic curve.

In the course of the discussion on prophylactic inoculation in pneumonia and influenza Colonel Victor C. Vaughan delivered a remarkable speech. Colonel Victor Vaughan, who for long has been recognized as one of the leading experts in immunology in America, has been associated closely with the health administration of the American Army and offers several ingenious views, to which we will refer at a later date. After warning his audience against accepting statistical evidence of cases, on the ground that at times influenza is diagnosed if a man sneezes once or twice, while in other places "they call it influenza pneumonia," he proceeded as follows:—

> We have tried with the greatest thoroughness the vaccines for influenza. We have used influenza vaccine in great quantities, all they could make in the Army Laboratory and have used all that Dr. McCoy could spare and also have used that which Dr. Park has furnished us from the New York laboratory and I do not hesitate to say that it has not done one bit of good. Speaking on this point with the evidence of the Pfeiffer bacillus not being the cause of influenza, I can agree with those who have spoken. To me the evidence that the Pfeiffer bacillus is the cause of influenza is not at all convincing, because, in the first place, it is by no means constantly found in the influenza or the sequelæ. In the second place, it is often even with greater frequency found in other diseases than it is in influenza. In the third place, influenza is characterized by a marked leucopenia, a matter that must be investigated more thoroughly. Injection of the Pfeiffer bacillus causes a leucocytosis, just the opposite, so I think the weight of evidence at least is against the Pfeiffer bacillus as being the cause of influenza. Besides, the first evidence that we had in the Army that virulent influenza was spreading through the world was the news we got in August that during the month of July influenza was exceedingly deadly in Germany. It was rife in Germany and caused a very high death rate. In July two conferences were called, one at Berlin and one at Munich, and Pfeiffer himself could not demonstrate in a large number of cases the Pfeiffer bacillus and, as you know, the general finding was a diplo-pneumococcus.
>
> So far as vaccination against pneumonia is concerned, we have encouraging results, not, however, overwhelming, but encouraging results concerning vaccine for pneumonia. At Camp Upton last year some 12,000 out of 30,000 men were vaccinated with lipovaccines of Types I., II. and III.. They were under observation six or eight weeks, after which they went overseas and there was much less pneumonia among them. The report has been published by Major Cecil and Major Austin and it was less during that six or eight weeks than it was among the unvaccinated. Since August, Major Cecil has vaccinated 80% of the troops at Camp Wheeler, about 15,000 or 16,000 troops altogether. He has vaccinated 80% of the troops that have been coming in all the time. They began at Wheeler with 4,000; then they came in bunches of several hundred. The latest report I had from Major Cecil, a day or two ago, was to the effect that there was practically the same number of cases of pneumonia among the vaccinated as among the unvaccinated; in other words, that there was just as much pneumonia among the 20% unvaccinated as there was among the 80% vaccinated. The pneumonias that did prevail were altogether of Type IV..
>
> I agree that we should approach this subject with an open mind, ever ready to accept facts; but let us know they are facts before we accept them.
>
> When it was decided to try vaccination, it was perfectly understood that this vaccination is not compulsory and that every time an individual was vaccinated or had to be vaccinated, he should be told that it was not compulsory. We have said to the men: "You can do as you please; we do not know whether it will protect you against influenza or pneumonia or not. It is an experiment." There is no compulsory vaccination at Camp Wheeler or anywhere else for pneumonia or influenza. There is compulsory vaccination for typhoid fever, but we are not justified in making any vaccination compulsory, until we have overwhelming evidence of its value; and any man, whether he be in private life, in the Army or in the Public Health Service, who vaccinates anybody for pneumonia or for influenza and tells him that it is going to prevent the disease, is not telling the truth.
>
> With reference to the mask, I am strongly of the opinion that we have overstimated its value. That is nothing against the mask, however. When I went to Camp Devens they were not using the mask. I called the doctors together and I simply said: "Shall we use the mask or not? It is not compulsory." But I said: "Every doctor who took care of cases of pneumonic plague and did not wear a mask died from it and every man who cared for pneumonic plague cases and did not wear a mask, did contract it. You can do as you please."
>
> I am pretty certain, not convinced, that hand to mouth infection is of more importance than droplet infection. The most frequent way in which respiratory diseases are conveyed from one to the other is by hand to mouth. I feel that we should at least think of this in order to make an effort to prevent the spread of the disease.

The Medical Journal of Australia.

SATURDAY, MARCH 15, 1919.

The Epidemiology of Influenza.

The medical world is discussing facts and fancies concerning the recent outbreaks of influenza. From these discussions much can be learned. Our task lies in endeavouring to weigh the evidence adduced in support of the many statements made in connexion with this disease and to ascertain whether a sufficient number of facts have been established to justify conclusions being drawn. In this issue we publish a summary of an important discussion held in Melbourne by the members of the Victorian Branch of the British Medical Association on February 19, 1919. We have the protocol of the meeting of the American Public Health Association at which the subject was discussed by the most prominent hygienists, epidemiologists and bacteriologists in the United States. In a recent issue of *The Practitioner* we have two valuable contributions bearing on the subject from Sir Arthur Newsholme, the Medical Officer to the Local Government Board and from Dr. D'Este Emery, the Director of the Laboratories at King's College Hospital. In addition we have innumerable articles written by medical practitioners of varying eminence in different countries. The mass of literature is so immense already that the task of sifting the evidence is a difficult one, calling for extreme caution and reservation. In the first place it is necessary to clear the field of the useless ballast. We must embark on the search for the truth with an open mind. To quote the words of Professor Victor Vaughan, we should be ever ready to accept facts, but "let us know they are facts before we accept them." The daily press and the magazines do not help us at all. The clinicians who have had experience of many cases, the morbid anatomists who have performed numerous post mortem examinations of the bodies of persons dead of the results of influenza, the bacteriologists who have engaged in a study of the organisms isolated from the bodies and body fluids of many patients and the epidemiologists who have borne the responsibility of endeavouring to limit the ravages of the disease—all these have given us facts and opinions through the medium of the medical press. The politicians have no scientific basis for their assertions and are therefore not to be regarded as contributors to the discussion.

The first question that needs a reply is: what is influenza? Sir Arthur Newsholme argues that the disease that first appeared in England in 1803, that recurred in 1833, in 1837, in 1847, in 1889 and again in 1918 is one and the same condition as the indefinite illness usually called influenza which occurs at all times and especially in the English winter and spring. His reasons for arriving at this conclusion are that the symptoms and complications are the same, that the bacteria associated with the disease in its epidemic form do not differ in any respect from those met with in the intervening periods and thirdly that these bacteria appear to enter into a symbiotic relationship either with one another or with the yet undiscovered causal organism of the disease. The pathological records, as well as the clinical characters and the bacteriological findings as published relating to the European epidemic of 1889-1892, correspond to those of the present epidemic. They also correspond to the described qualities of the inter-epidemic disease. Few diseases have received more numerous names than this one. This multiple designation tends only to confusion. Until the ætiology and pathology are more thoroughly understood, one name is as good as another, provided that it does not convey an ætiological inference. Since it is called influenza, we should resist all attempts to introduce another name. In the next place, if we accept Sir Arthur Newsholme's reasoned deduction, we should avoid qualifying epithets, such as Spanish influenza, pneumonic influenza, virulent influenza, influenza vera, etc.. In regard to other disease we recognize varying degrees of virulence. Yet we do not distinguish between outbreaks of diphtheria, enteric fever or tetanus, according to the virulence of the

infecting organism. Dr. A. V. M. Anderson has raised the question that has been in every thoughtful practitioner's mind for weeks. Is the disease at present in Australia different from the disease that was extremely prevalent from August to October, 1918, in practically every State? The answer that Sir Arthur Newsholme and, indeed, almost every clinician and pathologist the world over would give appears to be in the negative. The difference is merely one of virulence. Is it possible, either by clinical means, or bacteriologically, or by pathological land-marks, to differentiate between the forms that have swept over America and New Zealand and the form that has been in Australia for many months? Those who had the responsible task of attempting to guard the Australian community against a disease with a high infectivity and a high mortality, sought for some sign whereby the difference might be recognized. Nothing could have been more human nor more humane. A single pathognomic sign or symptom would have been invaluable. They clutched at a straw, because of the vast epidemiological gain of such a sign or symptom. Attention has been directed to the cyanosis which is described most vividly by many speakers in the Victorian discussion. We learn, however, that the same cyanosis, or what appears to be the same, has been noted in pneumonia complicating influenza in the Commonwealth outside the present epidemic. The literature contains repeated references to the association of hæmolytic streptococci and Pfeiffer's bacillus with the pneumonia complicating this disease. Views are divided whether the cyanosis is of central nervous origin or is caused by a direct action of a bacterial product on the hæmoglobin. In either case this sign would be at most pathognomonic of a complication and not of the disease itself. The claim has been made that in real influenza hæmorrhagic infarcts are found in the lungs. In the first place we learn from Dr. McMeekin that there is merely a superficial resemblance; in the second place we have to recognize that even if this change were characteristic of certain cases, it would only indicate a type of complication of influenza. Dr. McMeekin has continued his pathological studies and has further interesting observations to record in a subsequent article.

Significance has been attached to the common experience that the victims of the disease are largely men between the ages of 20 and 40 years. Professor Victor Vaughan has offered an explanation for this undoubted fact. The explanation appears to us to be plausible. It is that influenza is a disease acquired only from person to person with close association. Elderly people do not seek crowded places and are less prone than young individuals to come into contact with many other people. He regards influenza as a disease of activity and points out that the most favourable conditions for spread are met within military barracks and camps. From a very extensive personal experience of the epidemic or rather epidemics in the American Army he has arrived at the conclusion that young people are not more susceptible than elderly people, but are merely more frequently exposed to infection. From the Victorian discussion we have the assurance of Dr. Latham that the disease breeds true to type; that a severe infection gives rise to another severe infection. We have given expression to this view recently in regard to all bacteria and other disease-producing organisms. The observation should be of value in prophylaxis. Sir Arthur Newsholme holds that notification and isolation are ideal measures of small practical importance. It would seem that the isolation carried out in quarantine at the various Australian ports and in New South Wales has been attended by no small measure of success. Whether the isolation carried out in Victoria has been effective or not in checking the spread of this disease cannot be ascertained at present. It will be necessary to examine very closely the protocols of the cases and the vital statistics when both are available, before a final opinion can be formed. On the other hand considerable attention should be given to the opinion of Sir Arthur Newsholme when he points out that it is a wholly impracticable proposal to endeavour to isolate all persons affected with the disease. Influenza is undoubtedly highly infectious from the first and there is often extreme difficulty in the diagnosis at this stage. It would have been impossible to have isolated all the infected people in America or in London during the height of the second 1918 epidemic. The death-rate in London during the seven weeks ending on November 26, was about 2 per 1,000 of population. Who knows how many people were affected, if the mild cases were included in the total?

VACCINATION AGAINST EPIDEMIC MENINGITIS.

It was customary to give five or six injections, and sometimes even a greater number, in producing immunity in the early days of our knowledge of the process of active immunization. While this practice is still followed in manufacturing the potent antisera employed for therapeutic purposes, it has become recognized, mainly as a consequence of the investigations and advocacy of Sir Almroth Wright, that sufficient resistance to infection with certain microbes as to afford protection to the great majority of persons exposed to contagion, may be induced by two or three inoculations with dead bacteria. A report[1] is furnished by Dr. Frederick L. Gates, a distinguished worker in the Rockefeller Institute for Medical Research, New York, on some recent vaccinations against epidemic meningitis. It is well known that two distinct types of meningococci exist which can be separated serologically. Recently Gordon has isolated four groups of these meningococci, but Tullock has brought forward evidence that two of these types are irregular variants of the main groups. The normal or regular meningococcus and the parameningococcus may therefore be considered as occasioning from 70% to 85% of the cases of epidemic meningitis in any locality.

In October and November, 1917, an outbreak of epidemic meningitis occurred at Camp Funston, Kansas. It was determined to undertake a series of antimeningitis vaccinations upon volunteer subjects from the Camp. Before proceeding with any general vaccination it was decided to carry out a preliminary series of vaccinations on a relatively small number of persons to determine appropriate doses and the resultant local and general reactions. All the persons used in this inquiry were obtained from the 342nd Field Artillery Regiment, in which only one case of meningitis had developed. This regiment had also been covered in a search for carriers of meningococci and appeared to contain no carriers of these microbes. Six groups containing 50 persons in each group were selected throughout the regiment.

The vaccine was made at the Rockefeller Institute from three organisms representing the two types of meningococci. While repeated injections of a number of strains of meningococci were used in preparing the highly polyvalent therapeutic sera of the Rockefeller Institute, it was not considered practicable to introduce more strains into the vaccine as only three injections were intended in the routine vaccination. While high polyvalency would be desirable for protective inoculation, Dr. Gates believes that the inclusion of any considerable number of strains in a vaccine for human use might defeat the purpose of vaccination by failing to introduce a sufficient quantity of any one specific antigen to give rise to protection against its strain. This opinion was fortified by the observation that sixteen strains isolated from patients in the Camp during December and January could be referred to one or other of the types used in preparing the vaccine.

The six groups of soldiers received three injections of increasing numbers of meningococci. The lowest doses were 500 millions, 1,000 millions and 2,000 millions, while the highest doses were 2,000 millions, 5,000 millions and 10,100 millions for the three injections. The periods between injections varied from four to ten days. Only two reactions occurred with doses of less than 2,000 million cocci. With the higher doses reactions were more frequent, but as a whole were mild as compared with those which may follow typhoid and paratyphoid injections. The occurrence of occasional reactions of severity led to the choice of lower doses for the general series as there was no desire to push the dosage to the limit of endurance. After each injection samples of serum were taken from a number of persons in each group. The samples were used to test for the formation of antibody. Each serum was tested against three strains of meningococcus which have been used for agglutinative tests at the Rockefeller Institute. These studies of the sera of over 100 vaccinated persons showed that no agglutination took place with the sera obtained from those inoculated with less than 1,000 million, 2,000 million and 4,000 million at the three injections. With those in the remaining three groups injected with higher doses agglutination was obtained against each of the three strains. In 19 persons in the group injected with 2,000 millions, 5,000 millions and 10,000 millions it was possible to compare the reactions with serum taken before inoculation and serum taken nine days after vaccination. An appearance of, or increase in agglutinins was observable in all but two instances. Dr. Gates concludes that it may therefore be stated that the injection of well-tolerated doses of meningococcus vaccine is followed by specific antibody formation in the human body.

In the general series of inoculations among roughly 25,000 persons, 4,792 accepted the first injection, 4,257 the second injection and 3,702 the third injection. At the third injection the dose was diminished to 4,000 millions in about half those vaccinated, owing to the occurrence of a number of fairly severe reactions among those inoculated with the larger dose of 8,000 millions meningococci. From January 21, 1918, when the inoculations were started, until June 4, 1918, there were 46 recognized cases of meningitis, of which three occurred among the vaccinated persons. Two persons developed meningitis twelve days after the first inoculation, one of these persons having also received the second dose. The third patient exhibited the disease two months after the third injection.

Encouraged by the results of the study of agglutinative tests after vaccination, Dr. Gates studied the sera of chronic carriers of meningococci. These persons are generally recognized as never exhibiting meningeal symptoms. Specific agglutinins have been demonstrated in the blood serum of these carriers. Dr. Gates writes as follows: "Whatever may be the relation of agglutinins to specific protection against invasion the agglutination test is recognized as the most reliable indication of antibody formation due to the meningococcus and is used generally in the standardization of therapeutic sera as an index of potency. With equal reason the presence of agglutinins may be taken as an index of active immunization after vaccination. We do not know the ratio of

[1] *Journ. Exper. Medicine*, Vol. XXVIII., p. 449, October, 1918.

agglutinin formation to protective power and can only discover by wide experience what agglutinin titers correspond to relatively complete immunity to meningococcus invasion. It is, perhaps, significant that the agglutinin titers of the sera of vaccinated men are of the same order of serum dilutions as those of chronic carriers who are usually refractory to the strains carried." Combating those who object to antimeningitis vaccination, Dr. Gates says that the purpose of prophylactic vaccination is to build up antibodies in the blood stream to prevent a hæmatogenous incursion of the meningococci.

THE CREMATION COMPANY OF NEW SOUTH WALES.

The only logical objection that has been raised to the adoption of the general practice of cremation is that incineration destroys all traces of the causes of death. But since cremation is not permitted until the cause of death has been established after careful post-mortem examination, the validity of even this objection fades away. The medical profession should be the prime movers in the introduction of a hygienic reform of this kind. In the New South Wales scheme four prominent medical practitioners—Drs. R. T. Paton, J. Foreman, J. M. Creed and A. L. Kerr—form a majority on the board of provisional directors. We regret to note that our four public-spirited colleagues are receiving but small support from the members of the medical profession in the State. We venture to suggest that those who approve of this means of disposing of dead bodies (which hygienist does not?) should supply tangible evidence of their belief in the system by taking a small number of shares. The price of each share is but five shillings. The investment, we feel convinced, is a safe one and while the return in monetary interest will not be large, it should be at all events higher than that paid on Government securities. A sum of £5,000 is required. A moiety of this sum could be provided by the doctors of New South Wales without any effort or sacrifice. Application forms will be sent from the office of this journal to anyone interested in the realization of a long-delayed reform.

THE INGESTION OF GROUND GLASS.

There is a popular belief, largely shared by medical practitioners, that powdered glass is highly dangerous when swallowed. Medical literature, however, is singularly silent concerning the effect of the ingestion of glass particles and in those few articles in which this subject is mentioned, there is but a general repetition of the popularly-held view that ground or powdered glass induces fatal lesions of the gastro-intestinal tract. Within recent times the daily press throughout the world has published alleged reports of deliberate attempts to inflict serious damage to persons by the contamination of food with ground glass. These reports, like many others appearing in the political press, created alarm on the basis of assumptions. In order to test whether powdered glass is capable of producing lesions in the gastro-intestinal tract, James S. Simmons and W. C. von Glahn[1] have carried out a series of experiments on dogs. Ten young dogs were given ground glass with their food. The glass was ground in a mortar and separated according to the fineness of the particles by means of sieves of varying meshes. Accurate records of weight, temperature, blood condition, fæcal content and general health were kept before and during the experiments. Each dog was given weighed amounts of ground glass mixed with lean meat. The glass was given at four-day intervals at first, but later it was given daily. At the completion of the experiments the dogs were chloroformed to death and macroscopical and microscopical examinations were carried out. The results were compared throughout with the corresponding conditions in control animals. From the first to the last both the experiment and control animals were kept under identical conditions. In no case was any effect on the general health of the animals noted. A few gained slightly in weight, others lost slightly, while yet others remained at the same weight. In no case was any blood or pus discovered in the fæces. The post-mortem evidence shows that no macroscopical or microscopical lesion was produced by the ingestion of ground or powdered glass. The quantities given varied from one to six grammes, according to the size of the particles.

[1] *Journ. of the Americ. Med. Association*, December 28, 1918.

THE RAT AND POLIOMYELITIS.

Although the results of Flexner and his pupils have gained a wide credence for their views on the causation of infantile paralysis, there have always been more or less noteworthy dissentients. For example, Rosenau and his followers insist that streptococci produce the disease and that the experimental results of Flexner are due to the inoculation of streptococci.

In a study of the epidemiology of epidemic poliomyelitis M. W. Richardson has concluded that the infection is spread from the rat to man by the agency of the flea. This hypothesis requires extended experimental investigations to determine its validity. H. L. Amoss and P. Haselbauer[1] have endeavoured to test this theory by seeking a reservoir of the causative micro-organism outside man, by inoculating the nervous tissues of rats suspected to be suffering from poliomyelitis into monkeys and by direct injection of infected nervous tissues into the brains of rats. In the first place they endeavoured to transmit poliomyelitis to monkeys by using for inoculation the central nervous organ of wild rats caught in the localities in Brooklyn in which numerous cases of the human epidemic disease prevailed in 1916. No results followed the injections of material from six rats. In the second place injections of the active virus of poliomyelitis into the brain of rats was made to determine how long the virus remained alive. Amoss had already found that the virus of poliomyelitis did not survive as long as seven days when injected in the brain of rabbits. Nine white rats received intracerebral injections of a glycerolated monkey virus. Subsequent injection of an extract of the site of inoculation in the

[1] *Journ. Exper. Medicine*, Vol. XXVIII., p. 429, October, 1918.

rat's brain into a monkey showed that the virus did not survive more than seventy-two hours. The amount of material injected into rats contained from ten to fifteen minimal lethal doses of the virus for monkeys. Attempts to transfer the disease to rats have all failed. From these results the authors conclude that it is not probably that the rat acts in nature as a reservoir of the virus of poliomyelitis.

Naval and Military.

CASUALTIES.

The 460th list of casualties, which was issued to the public on March 5, 1919, contains 548 names, of which 90 are of those who have died and 18 of those who have been wounded. The only medical officer mentioned in the list is Captain George Sutton, whose name appears among those injured.

HONOURS.

In the *Commonwealth of Australia Gazette*, No. 31, of March 4, 1919, various abstracts from the *London Gazette* are published concerning the awards of military honours. These notices include references to the award of the *Croix de Guerre* to Lieutenant-Colonel Alexander Hammett Marks, D.S.O., and to Major (temporary Lieutenant-Colonel) Valentine Osborne Stacy. The information was published in *The Medical Journal of Australia* of January 11, 1919, page 37.

In the same *Gazette* are published from the *London Gazette* the records of the deeds of conspicuous gallantry and devotion to duty for which the Distinguished Service Order was awarded to Lieutenant-Colonel Arthur Mitchell Wilson and Major Frederick Neill Le Messurier, for which the Bar to the Military Cross was awarded to Captain Frank William Fay, M.C., and for which the Military Cross was awarded to Captain Donald Walter McCredie and Captain Algernon George Rowley Lilford. These details have been published in *The Medical Journal of Australia* of February 22, 1919, page 161.

The following announcements of the award of the Military Cross has appeared in the *London Gazette* of December 2, 1918:—

Military Cross.

Captain Thomas Ross Jagger, Australian Army Medical Corps, attached 21st Battalion, Australian Infantry. For conspicuous gallantry and devotion to duty. He carried on his work under heavy fire during two attacks and attended to the wounded of his own and other units with utter disregard to danger. He set a splendid example of courage and self-sacrifice.

Captain (now Major) Sydney Michael O'Riordan, Australian Army Medical Corps, attached 13th Battalion, Australian Infantry. For conspicuous gallantry and devotion to duty. During the later stages of an advance, when the infantry were under heavy fire, he established his aid post in an advanced position and dealt very rapidly with the casualties. His initiative and coolness under heavy fire were an inspiration to all who came in contact with him.

Captain Francis Louis Trinca, Australian Army Medical Corps, attached 1st Light Horse Field Ambulance. For conspicuous gallantry and devotion to duty. During an attack this officer, although suffering from fever, carried out his duties with great energy and total disregard of danger. Later he accompanied the troops in a counter attack, attending to casualties in the open under fire and setting a fine example of endurance.

Captain Frank Elliot Trenoweth True, Australian Army Medical Corps, attached 48th Battalion, Australian Infantry. For conspicuous gallantry and devotion to duty. He moved forward with the assaulting troops under very heavy fire, establishing his aid post and organizing his stretcher bearers and was the means of saving many of the wounded. He carried out his duties under heavy fire with great skill and courage.

The following medical officers have been awarded decorations:—

Distinguished Service Order.

Major Robert Fulton Craig, 15th Field Ambulance.

Military Cross.

Captain Leslie Thomas Allsop.
Captain Joseph Ringland Anderson.
Captain William Johnstone Binns.
Captain Arthur Poole Lawrence.
Captain Edward Albert Woodward.

APPOINTMENTS.

The following appointments, etc., have been announced in the *Commonwealth of Australia Gazette*, No. 32, of March 6, 1919:—

Australian Imperial Force.

First Military District.

Captain J. H. B. Brown, M.C., Australian Army Medical Corps, to be Deputy Assistant Director Medical Services, Australian Imperial Force Depôts in United Kingdom, *vice* Major F. T. Beamish, and to be temporary Major whilst so employed. Dated 24th October, 1918.

Second Military District.

Captain J. a'B. D. Barton, Australian Army Medical Corps, to be temporary Major. Dated 9th December, 1918.

Third Military District.

Major R. D. Bartram, M.C., Australian Army Medical Corps, to be Deputy Assistant Director Medical Services, 3rd Australian Division, *vice* Major W. Vickers, D.S.O., Australian Army Medical Corps. Dated 8th September, 1918.

APPOINTMENTS TERMINATED.

Second Military District.

Lieutenant-Colonel W. M. A. Fletcher. Dated 25th February, 1919.

Fifth Military District.

Major J. P. Kenny. Dated 17th November, 1918. (This amends the reference to Major C. P. Kenny, which appeared in Executive Minute No. 890/1918, promulgated on page 2372 of *Commonwealth of Australia Gazette*, No. 195, dated 19th December, 1918.)

Australian Military Forces.

The undermentioned, who have served in the Australian Imperial Force as Commissioned Officers, having the rank held by them in the Australian Imperial Force confirmed as honorary rank in the Australian Military Forces, as follows:—

Officers who, on appointment for active service, were serving, and are now serving, in the Australian Military Forces:—

First Military District.

To be Honorary Lieutenant-Colonel—
Captain G. W. Macartney, Australian Army Medical Corps. Dated 2nd May, 1918.

Second Military District.

To be Honorary Lieutenant-Colonel—
Captain C. W. Thompson, M.C., Australian Army Medical Corps. Dated 19th September, 1917.

To be Honorary Major—
Captain F. C. Curtis-Elliott, Australian Army Medical Corps. Dated 12th February, 1918.

Third Military District.

To be Honorary Lieutenant-Colonel—
Captain B. Quick, Australian Army Medical Corps. Dated 20th February, 1917.

Fourth Military District.

To be Honorary Lieutenant-Colonel—
Captain E. A. H. Russell, Australian Army Medical Corps. Dated 21st October, 1917.

Our attention has been drawn to an error which appeared in the *Commonwealth of Australia Gazette* in the attaching of the letters D.S.O. to Major W. R. Kelly's name in connexion with the termination of military appointments. The error was repeated in our issue of February 22, 1919, page 162.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

(89) Ocular Lesions of Influenza.

In the November, 1918, issue of the *American Journal of Ophthalmology* Edward Jackson deals briefly with the ocular lesions met with in influenza and, although he admits that until the present pandemic has subsided for some time it may be regarded to be premature to make positive statements, he places some facts of interest before his readers. In the first place he admits that the proportion who have eye lesions is at present small; but, in view of the fact that there are such large numbers who have been victims, the aggregate of those with eye lesions must be very large. The influenza bacillus, in forming a toxin which has an affinity for the whole nervous system, resembles the diphtheria bacillus. This toxin causes spasm or paralysis of accommodation, pareses or paralysis of the extra-ocular muscles, photophobia, transient amblyopia, optic neuritis and atrophy, neuralgic pains and persistent and long enduring asthenopia. In children under one year old the conjunctivitis met with may resemble a gonococcal infection, or there may be a pseudo-membrane. The cases are mild and do not usually involve the cornea. In regard to the signs and symptoms, one of the first is swelling of the upper lids, at times without a conjunctivitis. Corneal ulcer as an extension of conjunctival inflammation ordinarily is rare, but dendritis and herpetic ulcers of neuropathic origin are common after influenzal conjunctivitis and a deeper inflammation may even cause uveitis. These conditions are post-influenzal. Panophthalmitis "with terrific pain," ending in few days with rupture of the globe, has been noted. A low-grade inflammation of a chronic nature may be present and without acute symptoms may end in shrinking of the globe. Degenerated blind eyes may become acutely inflamed by influenza. The vitreous may be so infected with bacilli that abundant cultures can be made in these cases of panophthalmitis. Orbital inflammation (cellulitis or abscess) may be one of the first manifestations; though only noticed when the general symptoms are waning. The greatest number of these cases, however, appear to follow the sinusitis sequelæ of influenza. The eyeball, ciliary ganglion, muscles and optic nerve have all been damaged after this orbital trouble. The optic nerve is most frequently affected by influenza. A sort of toxic amblyopia and retro-bulbar neuritis, "with some visible alteration of the nerve head, has been recognized." Both nerves may be affected. Partial or complete recovery may follow. Less often complete optic atrophy results, especially in sinusitis cases, and this appearance may warrant the opening up of the sinuses, even in the absence of other positive evidence, including skiagraphic records. Jackson mentions the retinal changes seen and recorded by Knapp, Thomas and Coats, such as star-shaped figure, granuloma and detachment of the retina. Glaucoma associated with or following influenza is not rarely seen. Senile cataract has shown marked advance. Some of these cases clear, but others are plainly accelerated. As a final word of timely warning Jackson concludes that opthalmologists will be consulted during the epidemic about complications such as acute conjunctivitis, swelling of the lids, metastatic ophthalmitis, orbital cellulitis and optic neuritis. Later will come "a greater number of cases in which the ocular condition must be regarded as a sequel to the influenza." The warning is that operations on the eyes involve a great danger from infection during the epidemic and should if possible be deferred unless delay would cause serious disadvantage.

(90) Thyroid Therapy in Ophthalmic Practice.

Percy Dunn (*British Journ. Ophthal.*, January, 1919), in an article dealing with the exhibition of thyroid extract in ophthalmic diseases, points out that an eye cannot maintain its freedom from the influences of toxæmias. Toxæmias attack the ciliary body with great readiness, because of its delicacy and vascularity. Many causes of toxæmia are known to show this effect in various ways. Two of these causes are known to produce toxæmic signs, with marked evidence of hypothyroidism, *viz.*, intestinal putrefaction and septic foci, such as in *pyorrhœa alveolaris*. One of the functions of the thyroid gland is to defeat auto-intoxication or auto-infection and that arising from disease producing micro-organisms with injurious products (toxins). The patient with sub-thyroid activity can and does easily fall a victim, owing to the lessened protection. In *pyorrhœa alveolaris* a toxin is produced by the germs, a toxæmia results and an irido-cyclitis follows. Thus the latter is not a disease *sui generis*. The thyroid gland has failed to control the toxæmia. He holds that keratitis punctata is most likely due to intestinal putrefaction. Here thyroid failure is most frequently overlooked. In these cases a family history of tuberculosis may be found in addition, or as an underlying cause. Dunn finds thyroid treatment of great benefit in these cases. Uncontrolled by thyroid action, toxæmias lower nutrition. Corneal ulcers therefore do no heal, but spread and end often in hypopyon. Pneumococcal ulcers also come under this category. The variability in infectivity lends support to this view. Interstitial keratitis may be more a hypothyroidal than a syphilitic manifestation. The thyroid insufficiency may be dependent on a possible tubercular taint, but the symptoms demanding urgent treatment will often yield quickly to thyroid therapy. Thyroid insufficiency is always in evidence at the menopause, and in these cases refractive defects corrected are not followed by ocular relief unless thyroid treatment be administered. Sub-conjunctival and sub-retinal hæmorrhages, the former in middle-aged women usually accounted a gouty sign, the latter often thought to be due to renal trouble, are frequently, if not always, due to hypothyroidism. These arterial hæmorrhages pre-suppose cerebral lesions as a possibility later. Recurrent retinal and vitreous hæmorrhages seen in young males, accompanied by epistaxis and constipation and high arterial tension, have been noted, and hæmorrhage and persistent constipation are among the various signs of hypothyroidism. The thyroid prevents the advent and progress of arterio-sclerosis.

(91) Idiosyncrasy to Quinine.

R. H. Elliot reports a case of unusual susceptibility to quinine poisoning (*British Journ. Ophthalm.*, January, 1919). The patient was a chemist who experienced unpleasant symptoms whenever he took small doses of quinine in any form for influenzal colds. Headache, deafness, difficulty of seeing clearly and contraction of the fields of vision were noted. In reading, the letters appeared doubled. He took for Elliot's observations a dose of 0.12 grm. of powdered quinine sulphate. Although the patient stated that his sight had not been so good since a severe attack of influenza some years before, he read $^{6}/_{6}$ with each eye, nearly $^{6}/_{6}$ with the right eye and slowly but correctly with the left eye and J1 with his own glasses. In 20 minutes he had a headache and deafness and was slow in manner. In three-quarters of an hour there was marked pallor of the optic discs and the arteries were lessened in calibre. The pupils were slightly dilated, but reacted to light and only slightly to accommodation. There was remarkable contraction of the fields. A control patient, who had taken 0.6 grm. of quinine hydrochloride, showed unaltered fields. The patient was given a cup of strong coffee, which he said always cleared his fields, three-quarters of an hour after his dose of quinine and the fields soon showed amplification. The colour vision remained normal throughout. Elliot states that the dose taken is the lowest yet recorded causing quinine amblyopia. With regard to the treatment, Elliot declares that, in spite of a case reported by Schwabe, in which the fields were further contracted after taking a cup of strong tea or coffee in a patient suffering from quinine amblyopia, caffeine has "justly earned a reputation" in the treatment of this condition. In this case and others recorded Elliot states that a decided attack may render a patient more sensitive to the action of the drug at future times. All cases of quinine amblyopia, he considers, should be reported, in order to decide the wisdom or otherwise of the large doses of the drug given by experts in tropical disease.

LARYNGOLOGY AND OTOLOGY.

(92) Antro-Nasal or Choanal Polypus.

From an analysis of the records of 35 cases of antro-nasal or choanal poly-

pus, Thomas Ewing (*Journ. Laryng., Rhin., Otology,* August, 1918) makes some interesting observations. The large majority of the cases occurred at ages below 20 years, affecting the sexes about equally, and showing no preponderating incidence in either side of the nose. Frequent catarrhal attacks, with unilateral nasal obstruction, were noted in the majority of cases, but pain, nasal discharge and ear symptoms were not usually present. The quality of the voice was affected in nine cases. By anterior rhinoscopy, facilitated at times by the intranasal application of cocaine, a solitary polypus was often seen extending downwards and backwards towards the naso-pharynx from the region of the accessory ostium of the antrum. In five cases a forward prolongation of the polyp towards the vestibule was found and in four cases ethmoidal polypi were also present. By posterior rhinoscopy, a smooth, glistening, globular mass, greyish-pink in colour, was generally observed, distinct from the mulberry-like appearance presented by the enlarged posterior end of the inferior turbinate. It was so large in some cases as to fill the naso-pharynx entirely and to become visible through the mouth. On digital examination it is found to be smooth, soft and mobile and free from the bleeding which characterizes naso-pharyngeal fibromata. By transillumination in 32 of the 35 cases the affected antrum illuminated to a greater or lesser extent, hence the method is not of great value for diagnosis. Ewing quotes Logan Turner and W. G. Porter to the effect that X-rays give far more information in these cases. In seven cases only of this series were X-ray examinations made and in all a blurring of the affected antrum was demonstrated. In fifteen cases histological examinations were made of the growths. One appeared markedly pseudo-cystic, the others resembled ordinary nasal polypi. All showed surfaces covered with epithelium, which varied in type in different areas, the variation being attributed mainly to continued pressure against neighbouring structures, whereby the type of original cells became degraded to a less specialized type. The stroma was of fibrous tissue, more cellular towards the surface, and containing many immature blood vessels, which in places were surrounded by small-celled infiltrations. Many of the sections showed pseudocystic spaces, lined by endothelium, scattered throughout the stroma, and also extravasations of blood. The site of attachment of the polypus was ascertained in fifteen cases, in twelve of which it occurred far back on the inner wall of the antral cavity, in close proximity to the accessory ostium. The growth is regarded as originating from a catarrhal swelling of the antral mucosa, which becomes polypoid or develops into a retention cyst. The possibility of its origin from a developmental error is also referred to. The growth usually passes through the accessory ostium into the middle meatus, either, as J. S. Fraser thinks, during the act of sniffing or hawking, when there is a partial negative pressure in the nostril, or, as Grünwald and Hajek suggest, it is forced out during inflation or lavage of the antrum. Once in the nose, it becomes gripped by the edges of the ostium, is unable to return and rapidly enlarges, probably owing to congestion and œdema. The author holds that, as it is practically impossible to remove the whole growth by means of the snare through the nostril, a radical operation through the canine fossa should be carried out. A local anæsthetic is satisfactory in most cases, but with children and nervous patients a general anæsthetic, given with the Junker inhaler, which, in adults, may be supplemented by the application of a solution of 5% cocaine locally, is to be preferred.

(93) Retropharyngeal Abscess.

Irwin Moore reports the case of a female, *æt.* 25, on whom he operated for a retro-pharangeal abscess (*Journ. Laryng., Rhin., Otology,* September, 1918). The patient's child had recently been operated on for tubercular glands of the neck, therefore it was thought the abscess might be tubercular. It was therefore decided to open the abscess through the neck to prevent the discharge reinfecting her. The abscess was opened by dissection along the posterior border of the sterno-mastoid, and 14 c.cm. of pus, containing tubercle bacilli, were evacuated. The thickened abscess wall was curetted and a drainage tube inserted. The wound healed in six weeks and there was no recurrence. After operation the patient suffered from paresis of the cervical sympathetic, manifested by (1) pseudo-ptosis, due to paralysis of the unstriped muscle-fibres of Müller, (2) enophthalmos, the eye appearing sunken and smaller than its fellow, resembling a badly-fitting artificial eye, (3) contraction of the pupil, with absence of dilatation on shading the eye, and (4) paresis of the upper portion of the right trapezius, the patient being unable to shrug her shoulder when pressure was made from above (cervical plexus, from third and fourth nerves). Treatment by faradism was carried out and a year later the symptoms had cleared up.

(94) Ethmoiditis Causing Blindness.

A case in which the removal of a necrosed ethmoid resulted in the full restoration of slight in a patient almost totally blind is reported by G. W. Dawson (*Proc. Royal Soc. Med., Laryngol. Sect.,* June, 1917). For six weeks he patient, a woman, aged 27, had had pain behind the eyes and over the bridge of the nose, and at length was only able to distinguish light and darkness. Pus was found in the nose. There was optic neuritis of the right eye, and the left eye was slightly affected. Two days after operation vision had greatly improved, and the neuritis had almost disappeared in a week. A month later vision in both eyes was found to be normal.

In the same issue E. D. D. Davis describes a case where the evacuation of pus from the right posterior ethmoid cells and sphenoid sinus in a patient who had had loss of sight (vision $^{6}/_{36}$) for four weeks resulted in the complete restoration of vision in a month. Right optic neuritis and exophthalmos were present; these completely disappeared.

(95) The Larynx As An Indicator of Pulmonary Tuberculosis.

During an examination of 300 men with bronchitis suspected of being tuberculous, Laurens, Joltrain and Petit-Jean (*Presse Médicale,* April 2, 1917) found that hyperæmia of the arytenoid mucosa regularly coincided with all the signs of pulmonary tuberculosis, the latter often in the first stage. Inter-arytenoid vegetations, soft and dusky in colour, and resembling the filiform papillæ of the tongue, and free of underlying infiltration, were also observed to be diagnostically significant, all patients exhibiting them being found to be tuberculous by stethoscopic or complementary signs of the disease. These villi, by their colour, are distinguishable from those of chronic laryngitis, and often occur discretely, independently of any other lesion of the mucous membrane. They cause no change in the voice, as they do not interfere with the movements of the arytenoids.

(96) Left Vocal Cord Paralysis.

In the June, 1918, number of the *Journal of Laryngology, Rhinology and Otology* Herbert Tilley, from a consideration of 23 cases of paralysis of the left vocal cord, each of which had the appearance of early abductor paralysis or recurrent nerve paralysis, emphasizes the fact that it is not always possible to differentiate between the abductor paralysis and immobility of the vocal cord, due to inflammation of the crico-arytenoid joint, especially in the early phases of the paralysis, when the physical signs of the primary lesion are not easy to detect. Hence, when a vocal cord is found motionless during phonation and exhaustive examination fails to reveal any gross lesion in the origin or course of the recurrent laryngeal it is not justifiable to give a hopeless prognosis as to its recovery of function, thus condemning the patient to a life of inaction and all the evils this may bring in its train.

(97) Treatment of Laryngeal Tuberculosis.

The treatment of laryngeal tuberculosis is discussed by H. F. Gammons in the December, 1917, issue of the *New England Medical Gazette.* He advocates applications of solutions of 20% argyrol and 2% formalin, the former when the mucosa is unbroken, the latter when ulceration has occurred. When there is any reasonable chance of improvement as far as the lungs are concerned formalin acts as a germicide and stimulates granulations, and is indicated especially when the ulceration is too extensive for the use of the cautery. An applicator is better than a spray, and should be used two or three times a week, after removing the laryngeal mucus with an alkaline wash.

British Medical Association News.

SCIENTIFIC.

A meeting of the Victorian Branch was held at the Medical Society Hall, East Melbourne, on February 19, 1919, Dr. J. Ramsay Webb, the President, in the chair. The meeting was held with the special permission of the Minister of Public Health for the purpose of discussing the epidemic of influenza.

Dr. R. P. McMeekin read a paper on the bacteriology of the present epidemic of influenza (see page 209).

Dr. V. M. O'Grady read a paper on the complication of the disease (see page 210).

Dr. W. S. Newton read a paper on the symptomatology of the disease (see page 211).

Dr. J. G. Whitaker read a paper on the prognosis of the disease.[1]

Dr. A. V. M. Anderson opened the discussion by referring to the prophylactic measures that had been introduced. In this connexion he stated that it must be remembered that infection could be conveyed by carriers of whom they had no knowledge. They had no information on which they could determine whether there was a difference in kind between ordinary influenza and pneumonic influenza, or whether there was a difference in virulence of the infecting organism. Influenzal cases had occurred both in Victoria and in other States since September, 1918. He asked the question whether these cases were the source of the present epidemic or whether there was an added organism.

In dealing with the question whether prevention was possible by the isolation of contacts, he pointed out that it appeared to be unfeasible to isolate all contacts of patients with mild infection, even if this could be done in the case of contacts of persons suffering from pneumonic influenza. It appeared to him that the latter provision was a reasonable method of prevention. There was no doubt that it was wise to segregate the patient with mild infection in hospitals from those with pneumonic involvement.

The infection appeared to come from the throat, nose and mouth and it therefore seemed advisable to require those in close contact with the patient to wear masks. The masking of the whole community, however, was a totally different matter. In hospitals where the nurses in attendance had been masked, this measure had not been sufficient to prevent the infection. He recognized that it was possible that the masks worn were defective.

The French *Académie de Médecine* had suggested that contacts should gargle with *liq. sod. chlorinat.* (1.2 grm. to 300 c.cm. of water) and that a 1% ointment of resorcin should be applied to the nostrils. The Royal College of Physicians had advocated the former measure.

Another prophylactic measure which had been adopted was the taking of 0.3 grm. of quinine daily and the frequent washing of the mouth with eusol, permanganate of potash and other antiseptics. It had been said that these measures had been attended with success in avoiding the infection. The impression gained at the Alfred Hospital was that complications were less severe if the patient had previously been inoculated. A small dose should be given at first. The question as to whether or not the inoculation should be repeated at intervals of three weeks was discussed.

Once the disease had manifested itself, the important point in the treatment was to put the patient to bed and to keep him there until some time after the temperature had returned to normal. At the Alfred Hospital the patients were not allowed to leave their beds until the temperature had been normal for four days. They were discharged three days later if no complication supervened. The patients should be placed under proper nursing supervision; the diet should be nourishing and should contain large amounts of liquids. Attention should be paid to the bowels and sufficient sleep should be secured. Hygiene of the mouth was important. If this be neglected in any illness, it was liable to be the cause of a pneumonic condition.

The treatment was largely symptomatic and was directed towards the relief of pain and the relief of sleeplessness. Veronal and small doses of aspirin were preferable to Dover's powder, which was apt to cause vomiting. It was inadvisable to give large doses of aspirin, such as 0.6, 0.9 or 1.2 grm. every four hours, and was not necessary, since small doses relieve the muscular pain.

There was no specific for these cases. *Liquor hydrargyri perchloridi* and salicin had been advocated but did no good in the pneumonic cases. He considered that citrate of potash and ammonium acetate were as useful as any drugs in simple cases. Too much citrate of potash might cause effusion into the bronchi; it must be abandoned when such an effusion occurred.

He advocated the treatment of persons suffering from influenza as much as possible in the open air. Iodide of potash and creosote were said to be specifics in lobar pneumonia. They were certainly not in influenzal pneumonia. Of the cardiac stimulants, digitalis was as good as any other. Pleurisy had been relieved by bleeding. In some cases of considerable pulmonary involvement, bleeding followed by venous transfusion had been employed with apparent advantage. He pointed out, however, that it was not often necessary to resort to bleeding. He had found that coagulose used to prevent hæmorrhages, occasionally yielded good results in the hæmorrhagic cases. The period of convalescence must be prolonged in some cases and the cardiac condition studied, particularly after a serious attack, and also in cases with one of the numerous sequelæ affecting the lungs and other organs.

Dr. R. R. Stawell said that he had formed very definite opinions about this epidemic, although much was still indefinite. The first most definite opinion was that the cases under discussion included cases of severe virulent "influenza," no matter by what name they were called, no matter whether they occurred during a mild epidemic or an "explosive" epidemic. The post-mortem appearances of the fatal cases showed that the condition present in the lungs was singularly unlike any other form of acute pulmonary affection. It was not like an acute bronchitis, for there was deeply blood-stained mucus in the bronchial tubes and not, except rarely, muco-purulent secretion. It was not like an ordinary acute broncho-pneumonia; there was blood-stained exudate in the bronchioles and alveolar spaces. It was not in the least like croupous or lobar pneumonia, for there was no fibrinous exudate in the alveolar spaces. It was not lobar in distribution and there was no associated flaky pleurisy. There were subpleural hæmorrhages. The condition of the lungs and other organs suggested an acute septic infection, with special tendency to hæmolytic changes, due quite probably to associated streptococcal sepsis.

The evidence afforded by the post-mortem appearances, that these cases were examples of typical virulent influenza, was confirmed by certain clinical signs and symptoms, characteristic of virulent influenza and of no other acute uncomplicated pulmonary disease. The signs and symptoms to which he wished to call attention were spontaneous hæmorrhages and blood-stained expectoration and the peculiar cyanosis seen in these cases.

Spontaneous hæmorrhages were common, epistaxis was very frequent, hæmatemesis, profuse melæna, severe menorrhagia, occasional hæmaturia, petechial eruptions and of course constantly recurring blood-stained sputum were all to be observed in this epidemic. In what other acute pulmonary disease were these signs to be found? Apart from acute pulmonary œdema and in certain forms of failing heart, no partial combination of these hæmorrhagic signs was present.

The cyanosis, as had been pointed out, was peculiar and characteristic. A very valuable contribution had been made to observations on influenza by Dr. Whitaker in the altogether admirable paper on prognosis which had been read that evening. Dr. Whitaker had emphasized a point that had not been recognized before, that the "early" cyanosis was not to be regarded as of the same grave import as the "late" cyanosis. What was the cause of the cyanosis? It seemed difficult to believe that the "early" cyanosis, with its faint heliotrope tinge, was due to the mere amount of pulmonary involvement. Even the "late" cyanosis, with its almost blue-black colouration, did not seem to be due entirely to pulmonary involvement, for though there was hurried breathing, there was singularly slight respiratory distress in these cases. Apart from the involvement of the structures of the alveolar spaces and the alveolar blood vessels and cells, it was possible that there was a direct involvement of the blood itself, such as a form of met-hæmoglobin. Clinical observations which he had carried out with a spectro-

[1] We hope to publish this contribution in a subsequent issue.

scope, were, however, inconclusive and he had not been able to demonstrate a met-hæmoglobin line in the spectroscope. More work might be done in that direction.

In discussing the question of the medical treatment of these cases, he would, like all other observers, emphasize the value of rest in bed and nursing care. If the symptoms and signs showed that the patient had passed beyond the borderland of acute febrile illness into the region of dangerous pneumonic disease, could any special medical treatment then arrest the downward progress? That in some of these dangerous cases recovery took place was undoubted. He had seen patients at the Melbourne Hospital who were most desperately ill, ultimately do well. In the main, it was obvious that for such patients a stimulating plan of treatment should be adopted and it was, as a matter of fact, adopted at the Hospital.

As regards certain practical points in treatment, he would say that, seeing that the cyanosis was not due to right heart failure, bleeding was not a reasonable plan of treatment nor did he think the application of leeches had the value it certainly had in croupous pneumonia. On the other hand, he did not think that the intravenous injection of eusol or saline solution was reasonable nor was he satisfied that the use of subcutaneous injections of saline solution was helpful. Though it was obviously desirable to dilute the toxins, it was also desirable to avoid a sudden increase of the bulk of the fluids in the tissues.

The use and the choice of the types of stimulant and the time of their administration required the most alert and careful consideration. He believed that the "exhilarant" type of stimulant, including alcohol, hypodermic injections of camphor and occasional injections of strychnine, was of definite value and that wisely given these stimulants determined the balance in the favour of the patient. There was, however, no advantage in giving the stimulants early in the disease.

In conclusion, he would say that he was of opinion that there was no "specific" treatment for the disease.

Dr. L. S. Latham said that at the outset of this epidemic many cases were seen in which there were pneumonic signs but no symptoms of influenza. At the time of speaking there were many influenza cases with pneumonic signs. There were also many irregular types, suggesting a renal, colic, sigmoidal or other bowel condition. The "influenza tongue" was very helpful in diagnosis, as was the comparatively slow pulse. In some cases there were no other influenzal symptoms, but there were abdominal symptoms. Cyanosis had been a prominent feature. It was not due to cardiac dilatation. He held the opinion that a poor quality of the first sound was a grave sign.

When the original infecting case was virulent, the infected case was also of a virulent character. Cases arising from virulent infection should be treated with the utmost care.

In every case details concerning inoculation were charted. Although no definite figures could yet be given, they had gained the impression that the illness followed a milder course in persons who had been inoculated. In conclusion, he stated that he wished to emphasize the necessity of great care in guarding against infection for all nurses in attendance. Medical practitioners in charge of cases could give valuable advice in this connexion.

Dr. C. H. Mollison dealt with the post-mortem appearances in four or five cases which he had examined. The only external characteristic of the condition was a flow of blood-stained mucus from the nose and mouth. In the lungs there was a patchy consolidation of a broncho-pneumonic type, with engorgement and hæmorrhages. The tissue was of leathery or friable consistence. Œdema was seen between the consolidated areas and there was marked congestion and redness of the air passages. Evidence of toxic processes was met with. The liver was swollen, the kidneys friable and the spleen swollen and soft. In the majority of cases minute hæmorrhages were found in the brain. In November, 1918, he had examined the body of a man who had broken his leg. Pneumonia was present and there were hæmorrhages in the brain. It was possible that this was an influenzal and not an ordinary pneumonia.

Dr. R. J. Bull stated that he was especially interested in the causation and prevention of the disease. The organisms found were those commonly present in inter-pandemic periods. Both from analogy and direct experiment there was evidence supporting the theory of a filterable virus in relation to the present epidemic. In conditions associated with a filterable virus, such as swine fever, hæmorrhages were common, particularly in the more acute types. The investigations into the ætiology of swine fever had led to the discovery of a filterable virus. If healthy animals were inoculated with the filtered blood of a diseased pig, the passage sometimes increased and sometimes diminished the virulence. The hog cholera bacillus only produced the disease with certainty if associated with the filterable virus.

From the remarks of some of the speakers it would seem that inoculation tended to ameliorate the symptoms of the disease, rather than to limit its incidence. He regarded inoculation as a personal matter and not as a national preventive, when viewed in this light. It was not the correct method of eliminating an epidemic disease. People needed to be educated to habits of cleanliness; coughing and sneezing in public should not be allowed. The spray from coughing and sneezing carried infection to others in the inverse ratio of the cubic root of the distance. For example, 27 times as many organisms would be inhaled by a person at a distance of one foot as compared with a distance of one yard.

During the period of an epidemic persons should be isolated three days before the first injection and up to two days after the second injection of vaccine, to ensure safety during the negative phase. They should be warned of the possible risk.

In referring to the question of masks, he stated that many were of faulty construction. Most commonly there was a bad fit at each side of the nose. This permitted the entrance of a current of unfiltered air. A properly constructed gauze mask arrested 97% of the organisms, provided that it was made of eight layers of gauze. If every person wore four layers of gauze, there would be eight layers of gauze between the mucous membrane of any two poeple. It was, however, preferable to have six layers.

Dr. B. Crellin advocated some scheme whereby the medical service could be made more efficient in case of a further outbreak. Medical men were spending a considerable amount of their time in travelling to the different suburbs.

All the cases he saw were of the asthenic type and the patient did not require any depletion. Alcohol was the only stimulant he found of much value. In his experience, it was best when given in small doses at frequent intervals.

Dr. J. F. Wilkinson stated that there had been a small outbreak at the McLeod Military Hospital. He wished to note a few points. In the Hospital there was an isolated community of about 1,000 persons. The greater number of these persons, however, travelled to the city three times a week. Compulsory inoculation existed and practically every individual had been inoculated. Mild cases of influenza had occurred until the first week in February, when the temperature of one man became raised soon after inoculation. Orders had been given that all patients with raised temperature should be sent to the Base Hospital. This man had to be kept where he was overnight. On the following day no further symptoms beyond the fever were present. One day later 15 or 16 cases of influenza developed among the patients and staff. Some of these patients were sent to the Base Hospital. Two of them died. In one of these patients pericarditis and pleurisy with effusion occurred. The effusion had to be removed by tapping several times. After that no more patients were sent away. All those attending in the ward were gowned, masked and capped. The masks were frequently changed and the hands were washed each time a patient had been attended to. There had been a few cases from town infection since, but none at all from infection in the Hospital. Every patient with fever was sent into the isolation ward. Patients were required to report at once if they felt ill and were put to bed within a few hours. Dr. Wilkinson held that this practice probably explained the incidence of the disease to a large extent. It did not appear that careful masking and gowning were of value in protecting those attending the patients.

Turning to the question of diagnosis, he called attention to the observation that many patients complained of tenderness over the side of the spine a little above the iliac crests. He thought that this sign might be helpful in the diagnosis in the early stages. He raised the important question as to how soon the patients could safely go abroad. Their practice had been to insist on a week's rest after the temperature had returned to the normal line, then a few days' isolation in

tents and separation, until all the bronchial secretion had dried up. By these methods they had, so far, completely arrested the epidemic within their hospital. With the exception of the initial outburst, he could not point to a single case in which the infection had been contracted from one of their patients.

Dr. T. W. Sinclair stated that it seemed quite impossible to isolate all contacts. For example, many instances had occurred of persons who were ill, going to work and mixing with a large number of people in factories and in other places. The question arose as to how much actual danger there was from "contacts." He held the opinion that the real risk was from those persons who were suffering from the initial symptoms of the disease. There was therefore greater difficulty in preventing the spread of infection by communal means. In regard to the treatment of patients, he held that frequent washing of the mouth and nostril would tend to minimize the spread and that masks were obviously an advantage for those in attendance. For the community generally, the aim was for "habits of biological cleanliness."

Dr. W. Ostermeyer, referring to the question of inoculation, stated that he had seen several cases of influenza develope a couple of days after the first inoculation. In consequence, he was very dubious as to the advisability of inoculating the unaffected members of a household in which influenza had gained a footing, especially if these unaffected members had been in close contact with a patient, because of the fear that the disease might exploit the negative phase of the inoculation. This might also apply to the second inoculation. He had seen one case develope after a fourth inoculation.

He was a firm believer in masks and thought that they had a future. A fool-proof mask had yet to be invented and probably never would be. He devoted considerable care to the instruction of the household attendants on a patient in the details of mask technique. He insisted on the patient coughing into a cloth held just before the mouth. The mask was removed when the wearer was well away from the patient and his room, on the ground that any prolonged use of an efficient mask was stifling and would tend to lower pulmonary and general resistance. Frequent hand-washing and mouth rinsing were integral accessories.

In closing the discussion, Dr. J. Ramsay Webb, the President, stated that he wished to draw attention to Dr. Latham's observation that if, in a group of cases, the patient originally attacked had the disease in a severe form, the persons infected by him revealed a tendency to suffer with similar severity. If this were proved to be true, some attempt should be made to isolate the contacts of patients with unusually severe forms of the disease.

Correspondence.

IMMUNITY AND RESISTANCE.

Sir,—The questions at issue between Professor Chapman and myself are fundamental. If the grounds on which he has based his argument are sound, a point of great practical moment is indicated. If, on the contrary, they are unsound, then his whole position is discredited.

As I understand his position, it is out of touch with modern thought on immunity to infection, which fully recognizes the great work done by the many pioneers in the investigation of antibodies, and yet frankly admits that immunity to infection by living bacteria does not necessarily depend upon any known antibody.

Professor Chapman sums up a review of historical facts in these words: "I have said enough to show that immunity is bound up with the formation of antibodies." Later on he says: "I regard the resistance to an attack of disease as being associated with the formation of antibodies." These vague statements do not touch the point at issue, which is: "To what extent is immunity bound up with the formation of antibodies?" and "To what extent is resistance to an attack of disease associated with the formation of antibodies?"

I have put before the reader facts that show that, in certain circumstances, an increased resistance to infection may be associated with a diminished capacity for the formation of antibody; and, in these circumstances, I interpret that association as one of cause and effect, so that the increase of resistance is the cause of the lessened output of antibody. I have also put before the reader evidence that, in certain cases, there is complete dissociation between an increased resistance to infection and the formation of known antibodies, so that a high-grade resistance may be met in the absence of every known antibody. Professor Chapman's position, as revealed by his original letter and by his reply to my criticism, is inconsistent with these facts.

When I said that the best explanation I could offer of resistance to infection was that the tissues of the living animal body were capable of being trained to resist and to overcome invasion by living virulent bacteria, I took it for granted that everyone would understand—and would give me credit for understanding—that the ultimate interchanges between the living cells of the animal body and the living bacteria that they were resisting would be chemical. But I cannot accept Professor Chapman's confident assertion "that this immunity to an attack of disease is dependent upon the chemical substances which appear within the body as a result of immunization." The facts of immunity which I have put before the reader point to a different working hypothesis—that the process of immunization by certain vaccines does not always add to the animal body the chemical substances on which immunity to infection ultimately depends; but that the immunization impresses on the living animal tissues an increased power of forming these chemical substances when the need for them arises; and that these chemical substances are not formed until the living animal cells are actually engaged with the invading bacteria. These chemical substances are not antibodies in the strict sense, since they are not preformed by the immunization. Anthrax immunity is a case in point. An animal, which has been rendered actively immune to anthrax bacilli and is then tested by inoculation with these organisms, may continue to harbour living virulent bacilli in its circulation for many days without manifesting signs of disease. No antibodies can be demonstrated; yet the animal is immune.

I now ask Professor Chapman to explain more clearly his position in regard to the argument to which I took exception, in regard to the well-known experimental fact which I consider him to have misread, and in regard to other facts of immunity which must also be considered in framing any working hypothesis of immunity to infection. I have already given my explanation. Will he now be good enough to give his?

I quote his argument again. "Many have urged me not to oppose inoculation with these vaccines, as the injections can do no harm. May I point out that I have invariably found that an animal previously injected with some other protein, toxin or organism, does not give such a considerable formation of antibodies as an animal in good health not infected with any other microbe. . . . It would thus appear that inoculation may lessen the resistance of the patient to an attack of the disease, if the organisms used in the vaccines are not those infecting the patient."

Question I. Does Professor Chapman consider that the experimental fact described by him gives any ground for opposing inoculation with the Federal and State vaccines recommended for use in pneumonic influenza, or any ground for his conclusion, "It would thus appear that inoculation may lessen the resistance of the patient to an attack of the disease, if the organisms used in the vaccines are not those infecting the patient"?

Question II. Let A be the animal previously injected with some other organism, and B the animal in good health not infected with any other microbe. When Professor Chapman injects microbes into his experimental animals and invariably finds that animal A does not give such a considerable formation of antibodies as animal B, does he consider that animal A gives a lesser formation of antibody in virtue of an increased resistance or in virtue of a lessened resistance to the later injection of microbes?

Question III. The observation which I took from the work of Keith Inglis is a particular instance of the experiment described by Professor Chapman where the microbes employed are the same throughout. A man receives a dose of typhoid vaccine and the antibodies (agglutinins) in his serum show a marked increase. Within ten weeks the agglutinin-content of his blood falls to a constant level. If at this stage the man receives a second dose of typhoid vaccine,

equal to the first dose, the rise of agglutinin will be much less than the original rise. Will Professor Chapman state whether he considers that his man gives a lessened production of antibody, at the time of the second injection, because of an increased resistance to typhoid bacilli or because of a lessened resistance?

Question IV. In the circumstances described in the preceding question where a diminished capacity for forming antibody is associated with an increased resistance to infection, how does Professor Chapman reconcile that fact with his declared position, which I understand to be that an increased resistance to infection necessarily depends upon an increased formation of antibodies?

Question V. From his own experience or from his knowledge of immunity, is Professor Chapman prepared to accept the fact that an increased resistance to infection may in certain cases be demonstrated along with the complete absence of any known antibody? If he is so prepared, will be explain how he reconciles that fact with his conception of the relation between the development of resistance and the formation of antibody?

Yours, etc.,

D. A. WELSH.

Laboratories of Pathology,
University of Sydney, March 4, 1919.

Sir,—Professor Welsh has assailed me in the lay press for my letters to *The Medical Journal of Australia* concerning the use of masks and of certain vaccines in connexion with the pandemic of influenza. To use his own words, he has dealt with me faithfully. He has assured the public that my letters to this journal teem with inaccuracies and he has promised to tell the public about these errors. In his articles in the *Sun* he has not made the slightest reference to what I wrote about the failure of masks in preventing persons wearing them from becoming infected and he has avoided the reasons which have led him to advocate inoculation with the State and Federal vaccines. In his first and second letters to this journal he tries to entice me to discuss with him the explanation of a fact in immunity. I decline to cloud the issue at present by doing so. The essential questions are the employment of masks and of certain vaccines as preventives for influenza. I stated that two or three injections of dead influenza bacilli do not confer any immunity against influenza. Whatever views I may hold on immunity in general, they have nothing to do with the fact, known to every immunologist, that the animal, repeatedly inoculated with influenza vaccine, is killed by the same number of influenza germs as the unvaccinated animal. However I may interpret the formation of antibodies, the explanation is absolutely immaterial to the fact that inoculation with a vaccine of Type I. pneumococci does not render a person resistant to an infection with Type II. pneumococci.

I have worked in the laboratory on the subject of immunity for years and I have endeavoured by diligent reading to make myself acquainted with what is being done by others in the rest of the world. I have failed to find any records of experiments which would lead me to conclude that inoculation with influenza bacilli gives any protection against disease caused by the influenza bacillus. Again, I have failed to find any evidence that pneumococci can be used indiscriminately in vaccines. Professor Welsh holds differently. I am told that his advice has been accepted by the majority of the Medical Consultative Committee. I am informed that the members of the Committee adopted his opinion without asking him to place his evidence before them. I am aware from my association with Professor Welsh at the University that no inoculations with influenza bacilli have been carried out by him before this epidemic on a scale to justify Professor Welsh forming an independent opinion. I invite Professor Welsh to place before the medical profession the evidence that has led him to advocate the use of the State and Federal vaccines for widespread inoculation. No one will be more ready than myself to give all possible attention to any published discoveries which have come to the knowledge of Professor Welsh, but which are at present not known to others in Sydney. Unless Professor Welsh soon indicates the evidence on which he bases his statements about the effects of vaccination with influenza bacilli and pneumococci, many of your readers will infer that this evidence exists only in his imagination.

I invite Professor Welsh again to fulfil his promise to the public by pointing out the errors in my letter about masks. When Professor Welsh has given his reasons for differing from me about the use of masks and of the Federal and State vaccines, I shall continue with him the discussion of the relation of chemical changes to immunity. May I remind my readers that it was the demonstration of the chemical nature of resistance that brought so much honour to my revered master, Charles James Martin.

Yours, etc.,

HENRY G. CHAPMAN.

The University of Sydney,
March 6, 1919.

ACCURACY IN DISPENSING.

Sir,—Your sub-leader in the *Journal* of March 1 prompts me to record some pharmaceutical experiences of mine. Locally there is only one chemist, whose labels bear the legend: "From Squires, Chemists to the King." Some time ago I prescribed a mixture containing *acid. sod. phosph.*. The typical acid taste was absent in the mixture obtained from the local pharmacy, but present in a test prescription made up at another chemist's shop. The local chemist admitted an error, apologized and the matter dropped.

Recently I referred a patient to a leading dermatologist. An ointment was made up firstly in Sydney, secondly at a large provincial pharmacy, and thirdly locally. Nos. 1 and 2 were apparently identical in colour, consistency and odour. No. 3 was different in every respect.

Finally some eye drops dispensed for a member of my own household arrived containing a liberal supply of dirt particles. Needless to say, the worm has turned and I am now doing my own dispensing.

The relationship between pharmacist, dermatologist and patient in the case cited above shows how far-reaching may be the consequences of negligent or unscrupulous dispensing.

The business of the chemist referred to is now on the market. If he sells am I to allow a fellow-practitioner in some other part of the State to run the risk of similar imposition.

I intend at least to submit his name to the Secretary of the New South Wales Branch with a view to forwarding it to the Secretaries of Local Associations.

A confidential list of such pharmaceutical improvisers might lead to considerable improvement in dispensing.

Yours, etc.,

"N.E.M.A."

March 3, 1919.

FRIENDLY SOCIETY LODGES IN VICTORIA.

Sir,—In Dr. Nesbitt's letter of February 21 he suggests that I asked: "What does the country practitioner gain from the protraction of the struggle?"

I did not intend to convey that meaning; in fact, my point was distinctly stated, *viz.*, that we should all keep out of lodge work until all the lodges accepted the terms of the Wasley Agreement; and that doctors in the city should not accept two lodges, "the Tramways Union and the Cosmopolitan Association," until all the lodges accepted the Agreement; otherwise it seems that the city practitioners are gaining a distinct advantage, just as those lodges are which join medical institutes.

With Dr. Nesbitt's other points one most heartily agrees.

Yours, etc.,

P. G. CLARKE.

Portarlington, Victoria,
March 4, 1919.

Correction.

In the geometrical proof of Sweet's method of localizing foreign bodies in the eye, published in *The Medical Journal of Australia* of March 8, 1919, page 191-2, there is an error in Figure I.. The lettering M''_1 and M''_2 should be transposed. It will be noted from the text that $M_1M''_2$ and $M_2M''_2$ are lines parallel to PP".

Medical Appointments.

During the absence on active service of Dr. Florence C. B. Gaffney (B.M.A.), Dr. H. A. Deravin (B.M.A.) has been appointed Officer of Health to the Shire of Strathfieldsaye, Victoria.

Dr. J. C. Morton (B.M.A.) has been reappointed Officer of Health of the Shire of Seymour, Victoria.

According to an announcement in the *Victoria Gazette* of March 5, 1919, the Midwives Board has been constituted as follows: Dr. Edward Robertson (B.M.A.), Chairman; Dr. J. S. Grieg (B.M.A.), and Mr. W. R. Anderson.

Dr. D. E. Williams (B.M.A.), of Fremantle, and Dr. G. H. S. Blackburne (B.M.A.), of Albany, have been appointed Medical Officers of Health under Section 11 of *The Health Act, 1911-18*, of Western Australia.

The appointment of Dr. Edward Angas Johnson as Deputy Inspector-General of Hospitals (South Australia) during the temporary absence of Dr. Bedlington H. Morris (B.M.A.) has been terminated.

The appointment of Dr. A. J. Gruen (B.M.A.) as Government Medical Officer at Cumnock, New South Wales, is announced in the *New South Wales Government Gazette* of March 7, 1919.

Dr. N. T. Bull (B.M.A.) has been appointed Officer of Health to the Shire of McIvor and Dr. S. E. A. Zichy-Woinarski (B.M.A.) to the Shire of Omeo, Victoria.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xv.

Department of Defence, Royal Military College, Duntroon: Officer in Medical Charge.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	All Friendly Society Lodges, Institutes, Medical Dispensaries and other Contract Practice. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Australian Natives' Association. Brisbane United Friendly Society Institute. Cloncurry Hospital.
TASMANIA. (Hon. Sec., Macquarie Street, Hobart.)	Medical Officers in all State-aided Hospitals in Tasmania.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA. (Hon. Sec. 6 Bank of New South Wales Chambers, St. George's Terrace, Perth.)	All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United Friendly Societies' Dispensary. Canterbury United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Friendly Society Lodges at Lithgow. Friendly Society Lodges at Parramatta, Auburn and Lidcombe. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. New South Wales Ambulance and Transport Brigade. Newcastle Collieries—Killingworth, Seaham Nos. 1 and 2, West Wallsend. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

Mar. 18.—Tas. Branch, B.M.A., Branch and Council.
Mar. 18.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
Mar. 19.—West. Aust. Branch and Council, B.M.A.
Mar. 19.—Western Suburbs Medical Association (Sydney).
Mar. 25.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
Mar. 26.—Vic. Branch, B.M.A., Council.
Mar. 27.—S.A. Branch, B.M.A.
Mar. 27.—N.S.W. Branch, B.M.A., return of ballot papers for election of members of the Council.
Mar. 28.—N.S.W. Branch, B.M.A., Annual Meeting.
Mar. 28.—Q. Branch, B.M.A., Council.
Apr. 1.—N.S.W. Branch, B.M.A., Council (Election of Officers and appointment of Standing Committees).
Apr. 1.—Tas. Branch, B.M.A., Council and Branch.
Apr. 2.—Vic. Branch, B.M.A.
Apr. 4.—Q. Branch, B.M.A.
Apr. 8.—N.S.W. Branch, B.M.A., Council (Quarterly).

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney, New South Wales.